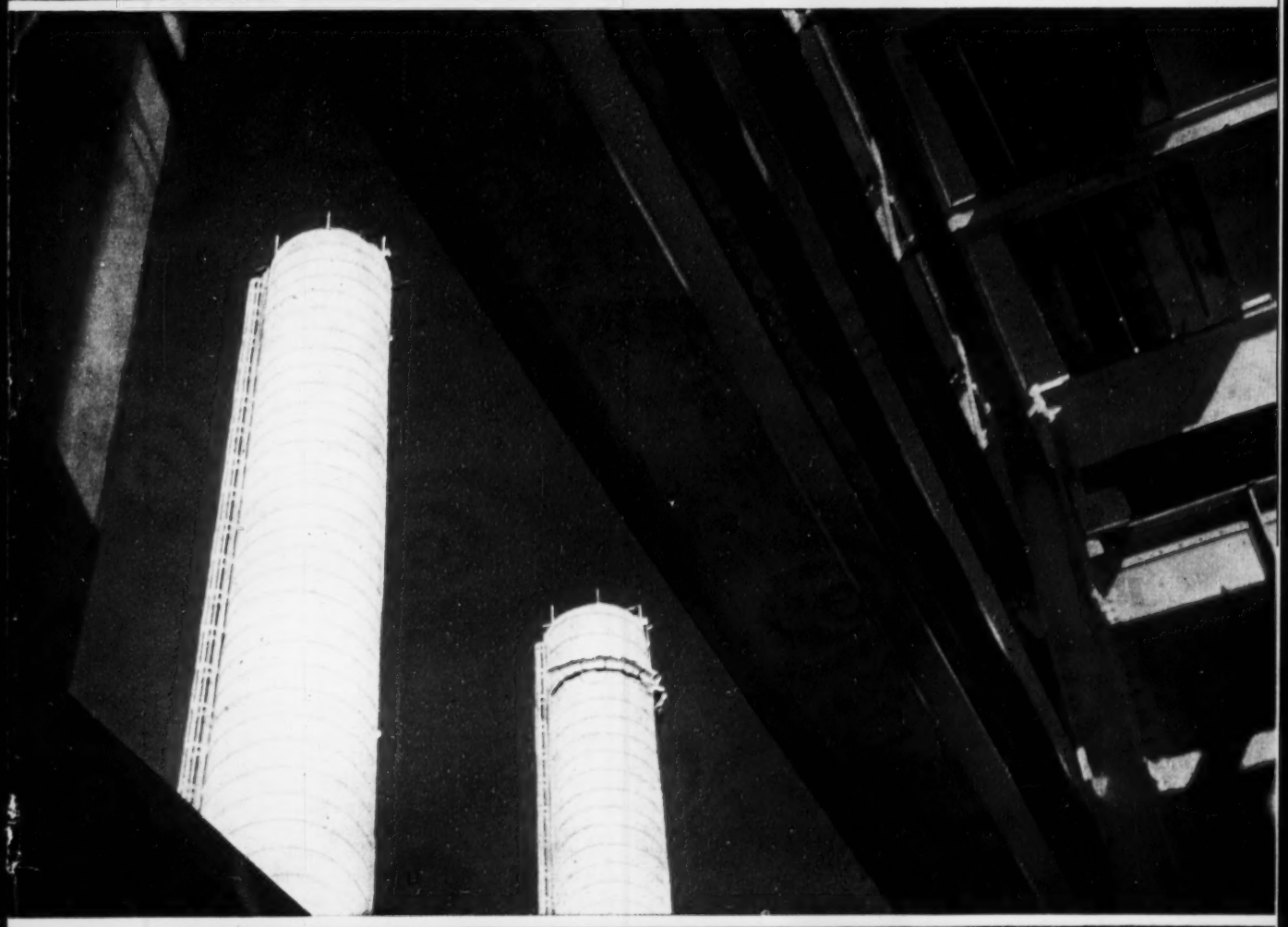
ENGINEERING NEWS-RECORD



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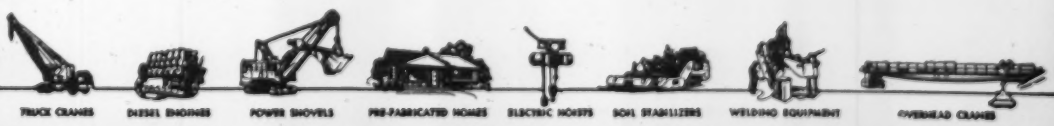

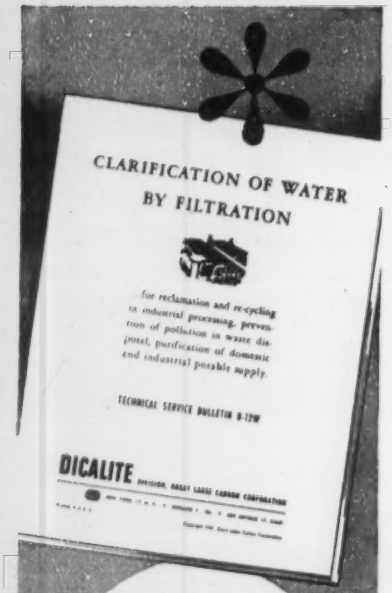
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Contents on page 17

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Publisher

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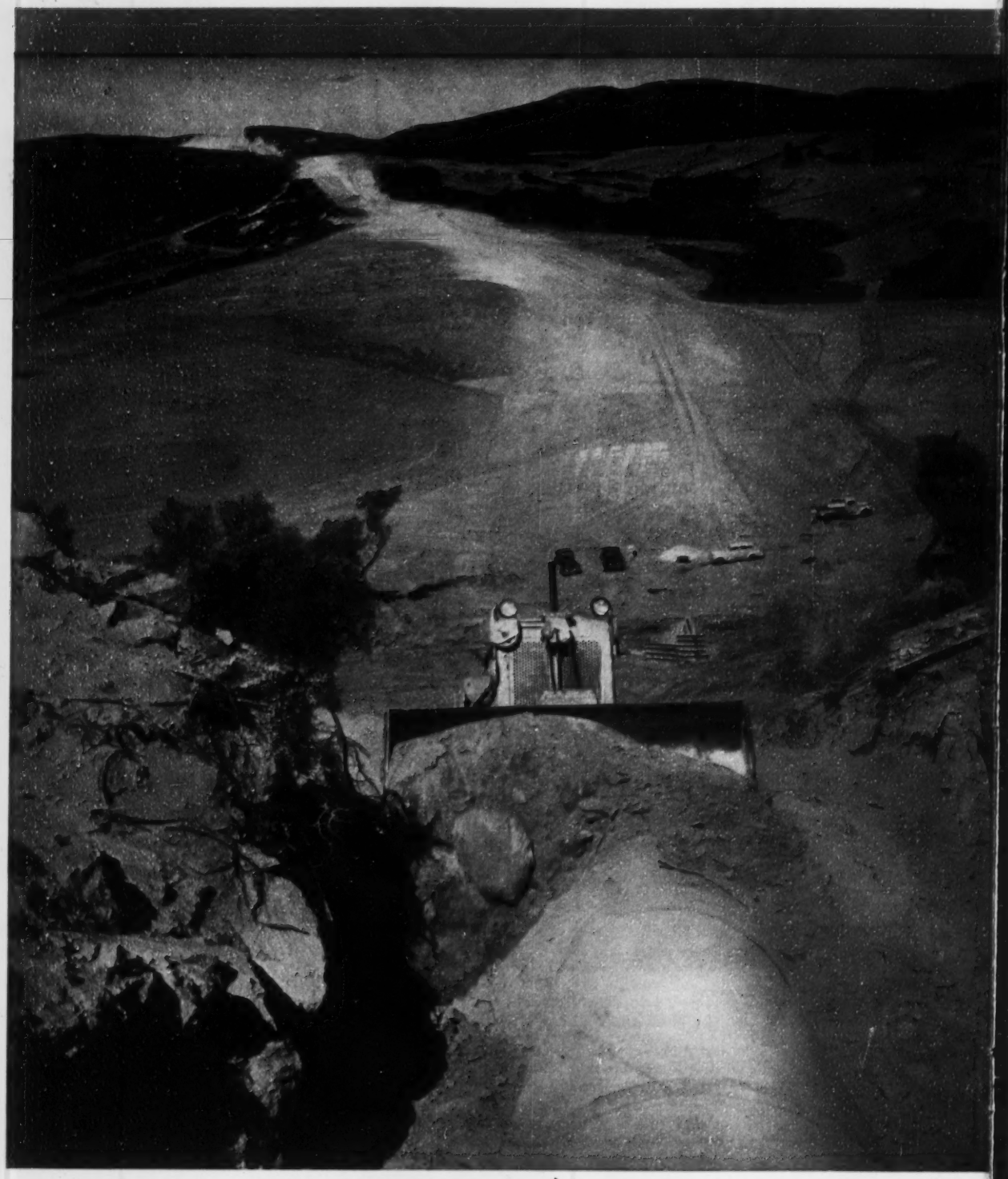

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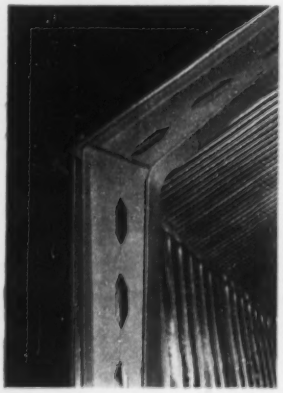

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(My name, position, company, address are written in the margin.)

READER COMMENT

Dinosaur rebuttal

SIR: Your editorial on the proposed Echo Park reservoir (ENR Jan. 21, p. 80) appears to be based on misinformation concerning the Sierra Club and the part we have played in opposing the proposed works. We have never contended that the dinosaur fossil beds would be lost. Nor have we attempted to lead the public to believe so. We are well aware that the fossil beds are outside of the reservoir areas. The dinosaur bones are not the bones of contention.

Our primary purpose is to protect the scenic canyon area of the Green and Yampa rivers. These canyons have scenic, geological and recreational features that are unique and irreplaceable.

Your contention that this area is inaccessible to the public is only partly true. Last summer 200 Sierra Club members, including myself, took a boat trip through this area. Included were 14 children ranging in age down to 4 years. That certainly doesn't indicate too difficult a trip. And the area can be made much more accessible. Conversion of the area from national monument to national park status as approved by a bill now before Congress would facilitate road construction for greater accessibility.

The presidential proclamation establishing the present 350 sq mi area of Dinosaur National Monument (we have a copy of it, of course) reserves a certain specific water storage project at the upper edge of the monument. It does not include the dams at present proposed. It does not, as your editorial alleges, make a blanket reservation for the entire area.

We oppose the Dinosaur National Monument sites because alternate sites outside the monument are available that would provide substantially the same hydroelectric and water storage facilities at a lower cost differential according to USBR figures. Along this same line, we are not opposing the proposed Glen Canyon Dam on the Colorado River. It, too, drowns out canyon areas that it would be desirable to perpetuate. But no alternates for this project are available.

A very serious charge against the Bureau of Reclamation's project is that their own figures still don't add up from an engineering standpoint. Simple analysis of Under Secretary of Interior Ralph Tudor's Jan. 18 testimony shows that his implication of an evaporation loss of 165,000 acre-ft

(Continued on page 10)

THE ACTUAL IS LIMITED:
THE POSSIBLE IS IMMENSE
NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCE
©LE Co. 1952

Welded design is credited with speeding construction of this 15-story, 48' by 98' structure as:

575 TON FRAME ADDITION IS COMPLETED IN LESS THAN TEN WEEKS

RISING costs of materials and labor can be offset by designing structures to take full advantage of arc welding. First of all, savings in steel of 10 to 20 per cent are possible through rigid frame, continuous beam construction and elimination of rivets and elaborate splice plates. And, as shown in the recent construction of this multi-story addition, fewer erection manhours are needed, shortening construction time by a substantial amount.

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Architects: Eggers & Higgins; *Engineer:* Wilcox & Erickson; *General Contractors:* Vermilya Brown Company; *Steel Work:* Grand Iron Works, Inc.

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PROOF... WELDED DESIGNS COST LESS TO BUILD

APARTMENTS

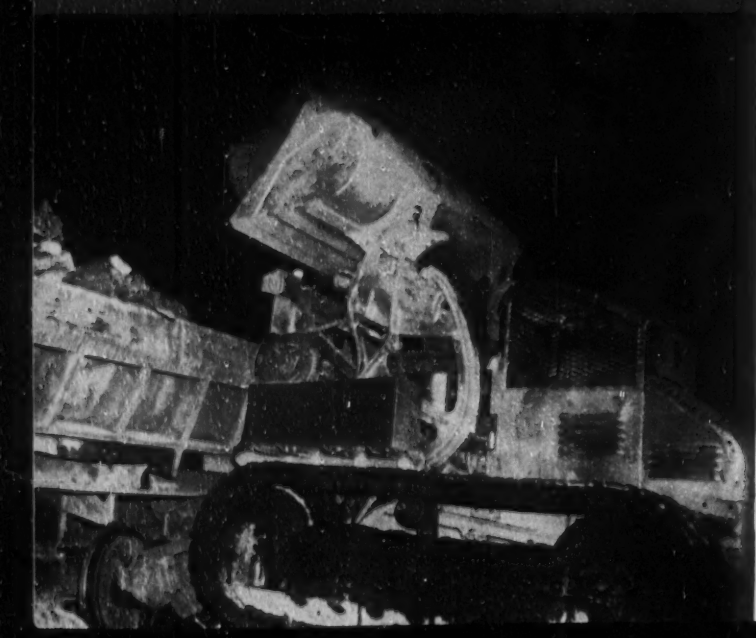
Fig. 1. Saves Over $30,000 *on 14 story framework for Broadview Apartments, Baltimore, Md. Steel tonnage is cut from 2045 to 1960 tons. Architects: Palmer, Fisher, Williams and Nes, Baltimore.*

GYMNASIUMS

Fig. 2. 20% Less Steel *is needed because of rigid frame construction made possible by arc welding. Overall saving is 6 to 10 per cent. Consulting Engineer: David R. Graham, Tulsa, Oklahoma.*

DEPARTMENT STORES

Fig. 3. Cuts Steel Tonnage 15%. *Through welded structural design, it was possible to save 15% on steel in the framework for J. W. Robinson's new department store in Los Angeles. Architects: Pereira and Luckman and Charles O. Matcham.*

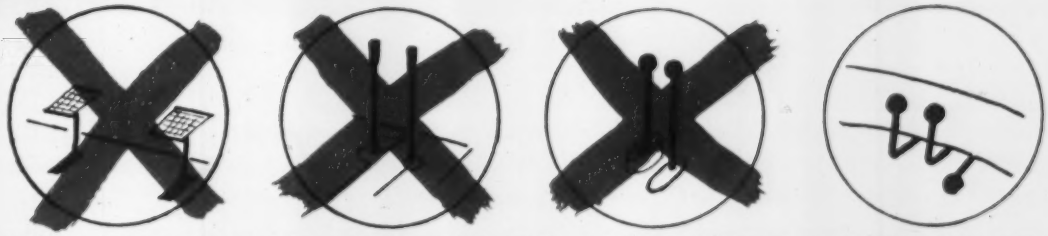


Nine yards a minute is fast loading, and you can do it with the Eimco 105. You can dig and load most ordinary materials without preliminary breakage.

The Eimco 105 is primarily an excavating machine with ability to load consolidated material. It will handle many jobs previously assigned to heavy cumbersome machinery costing several times the price of the 105.

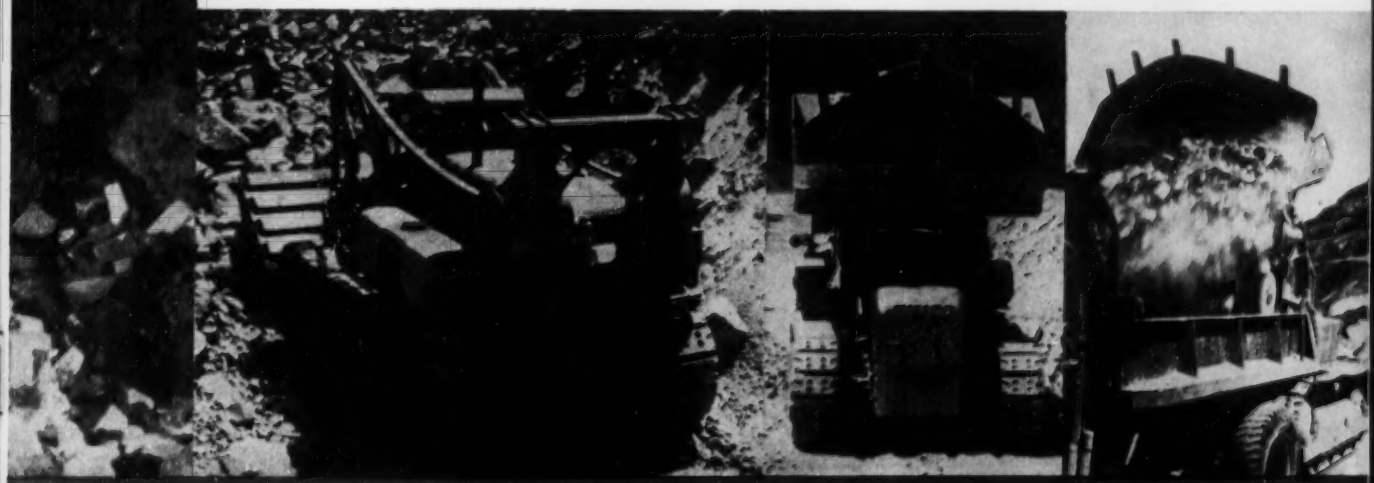
Steel castings and steel construction throughout make the 105 rugged and dependable. It is truly the first crawler unit designed to work under the added thrust and weight loads applied by the numerous attachments now available for contractors and industry that are accepted as part of the prime movers they buy. Its all steel construction makes it resist breakage from impact or abrasion which all machines encounter in normal working.

R WITH COST SAVING ADVANTAGES



The 105 is a modern tractor, designed to meet the needs of modern, up-to-date machinery users. The need of clutch pedals has been eliminated, the use of steering brakes has been removed and the need for shifting transmissions by hand is no more. The Eimco 105 works smoothly and efficiently with two small levers which control the tracks on their respective sides. The 105 may be shifted from forward to reverse independently on either track with no clutching — no shifting. Turns can be accomplished by twisting one lever to forward position and the other to reverse to provide spin turns, or longer turns can be effected by proper manipulation of these same handles. Gear changing is done with a separate small handle which may be actuated at any time during the operation of the machine.

The cycle of the loading unit is fast (see below) — digging or excavating is forward, discharge is overhead to the rear. Complete cycles from digging position to digging position average 10 to 15 seconds, which will permit loading of 6 to 9 yards per minute depending on material being loaded and travel distance.



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8-9

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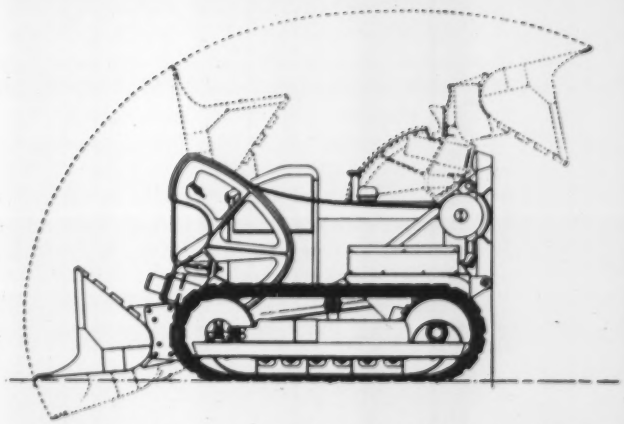
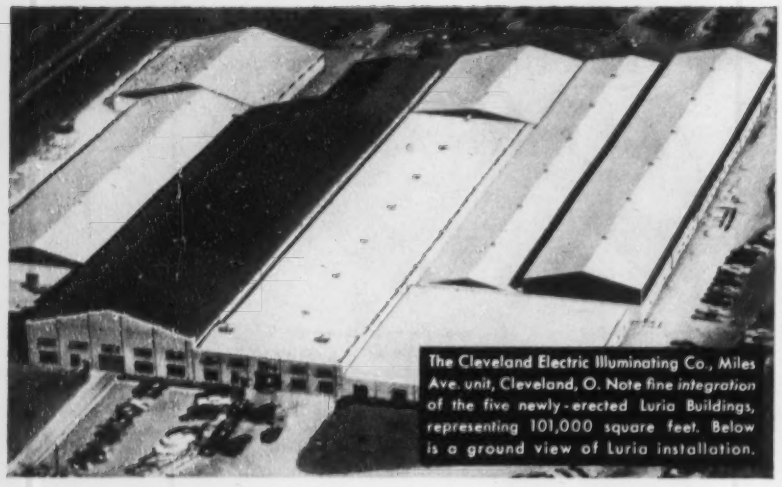


Rocker-arm loading action provides fast, efficient loading. Bucket shown in the digging, carry and discharge positions pictured above.


The Cleveland Electric Illuminating Co., Miles Ave. unit, Cleveland, O. Note fine integration of the five newly-erected Luria Buildings, representing 101,000 square feet. Below is a ground view of Luria installation.

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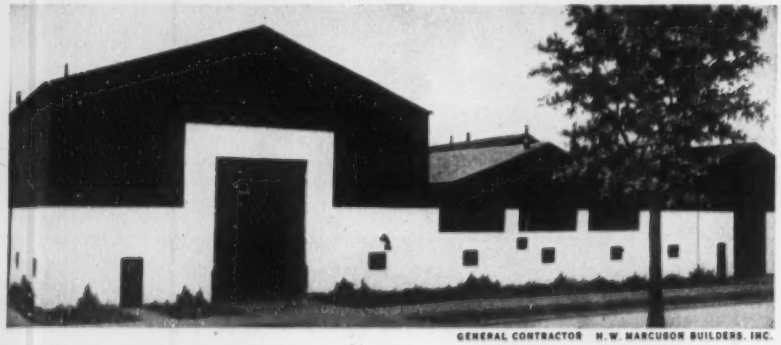
LURIA Standardized Buildings



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READER COMMENT

from the alternate site actually turns out by his own figures to be a net gain of 2,600 acre-ft, less evaporation. This is accomplished by increasing the storage at Glen Canyon as a substitute for Echo Park.

The Flood Control Act of 1944 expressly provides for analysis of such projects by the Bureau of the Budget, Federal Power Commission and the Corps of Engineers.

On cross-examination, Reclamation Commissioner W. A. Dexheimer admitted that an engineering analysis by the Corps of Engineers had been made and that it was "generally unfavorable". He has not, however, made that report available either to the public or to Congress. Such study is essential and I hope that the ENGINEERING NEWS-RECORD will insist upon an impartial analysis by well qualified men representing the independent engineering profession.

The 62-year old Sierra Club has 8,000 members in 46 states. We are much more than a Pacific Coast "wildlife" group as your editorial suggests. A past president of the American Society of Civil Engineers has been a member of the club for nearly 50 years and is one of our honorary vice-presidents. The current president of the Institute of Radio Engineers and the 1955 president of the American Chemical Society are members. We are deeply devoted to the protection of our natural scenic resources and have members with technical competence and ability to analyze these problems on a truly objective basis.

RICHARD M. LEONARD
President, Sierra Club,
San Francisco, Calif.

[EDITORS' NOTE: We did not intend to imply that the Sierra Club was contending that the fossil beds would be inundated. What appears to be misleading the public is not so much what is said as what is not said by those who oppose the proposed Echo Park reservoir. A simple factual statement that the reservoir will flood part of the Dinosaur National Monument, means to the general public that some or all of the fossil remains will be lost, as is evident in newspaper reports and editorials that we have seen.

Our statements about what the Park Service agreed to and about the President's proclamation enlarging the Dinosaur National Monument were based on statements made to us by a responsible officer of the Colorado River Water Conservation District.

We agree with Mr. Leonard that

(*Continued on page 12*)

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READER COMMENT

this is a subject requiring "impartial analyses by well qualified men" from the engineering profession. Our editorial was a protest against pressure groups trying to influence Congress.]

Credit where due

SIR: As subscribers of long standing to the ENGINEERING NEWS RECORD, we note with great interest your issue of Feb. 4, which featured the new East Side Airlines Terminal, owned by Triborough Bridge and Tunnel Authority, and constructed by our firm as general contractor.

We also note, with some chagrin, that we, the people who had so much to do with its erection, were omitted from mention in your story.

The construction of so important an edifice, built as it was under competitive bidding, is a matter of teamwork, and all parties involved in its successful completion should be recognized.

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CALENDAR

Associated General Contractors of America, Hotel Statler, Los Angeles, Calif., March 1-4.
Illinois Highway Engineering Conference, University of Illinois, Urbana, March 2-4.
N. Y. State Association of Highway Engineers, Arlington Hotel, Binghamton, N. Y., March 3-5.
N. J. Sewage & Industrial Wastes Assn., Traymore Hotel, Atlantic City, N. J., March 10-12.
Association of Highway Officials of the North Atlantic States, Hotel Shoreham, Washington, D. C., March 10-12.
American Railway Engineering Association, Palmer House, Chicago, March 16-18.
Southern Municipal and Industrial Wastes Conference, N. C., State College, Raleigh, N. C., March 18-19.
American Congress on Surveying and Mapping, annual meeting and exhibit, Hotel Shoreham, Washington, D. C., March 22-24.
Rail Steel Bar Association, annual meeting, Jung Hotel, New Orleans, La., March 24-26.
American Power Conference, annual meeting, Sherman Hotel, Chicago, Ill., March 24-26.
Southeastern section AWWA, Poinsett Hotel, Greenville, S. C., March 29-31.
6th annual highway short course, South Dakota State College, State College, S. D., April 7-9.
Second International Congress on Irrigation and Drainage, Algiers, Algeria, April 12-17.
American Institute of Steel Construction, national engineering conference, Hotel Schroeder, Milwaukee, Wis., April 13-14.
Society for Experimental Stress Analysis, Netherlands Plaza Hotel, Concinnati, Ohio, April 14-16.
Conference on instrumentation in water, sewage and industrial waste treatment, Manhattan College, New York City, April 20.
Southern Industrial Wastes Conference, Hotel Shamrock, Houston, Tex., April 21-23.
Western Mountain District, American Institute of Architects, annual conference, La Fonda Hotel, Santa Fe, N. M., April 22-24.
Pacific Southwest Conference ASCE, Senator Hotel, Sacramento, Calif., April 29-May 1.

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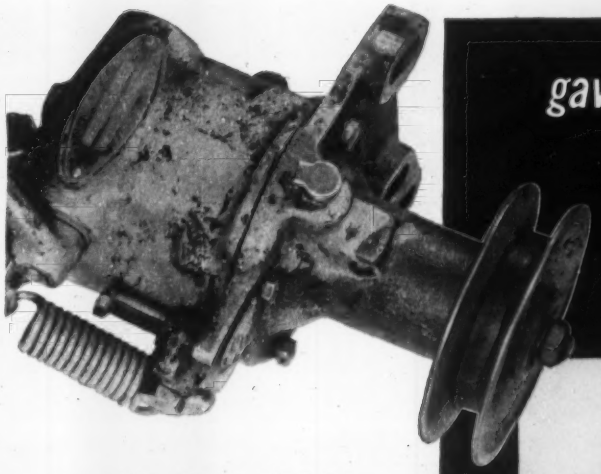

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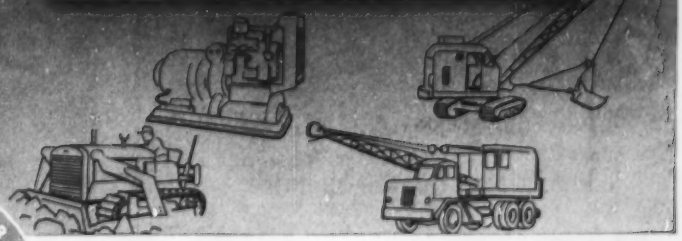

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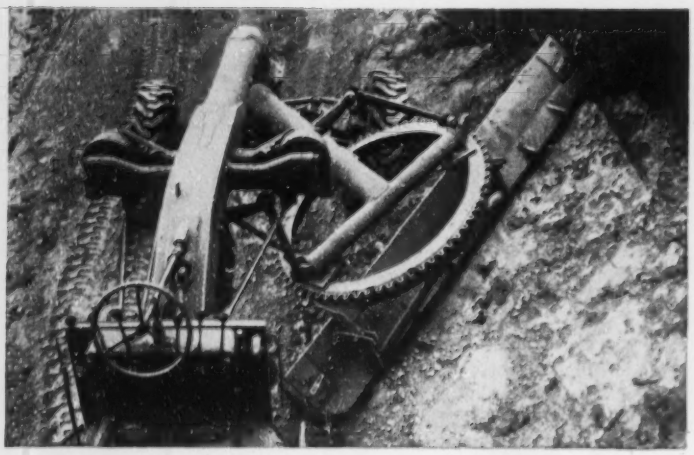

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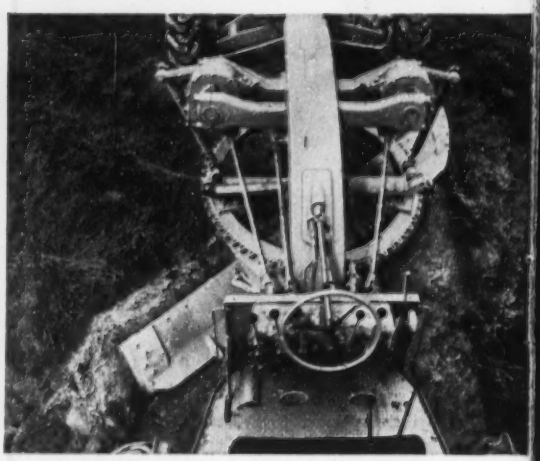

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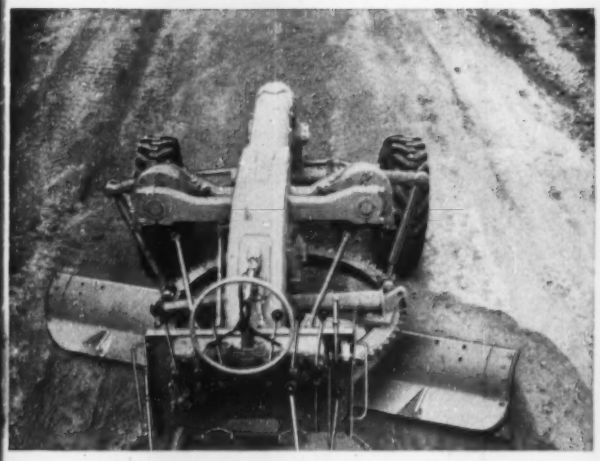

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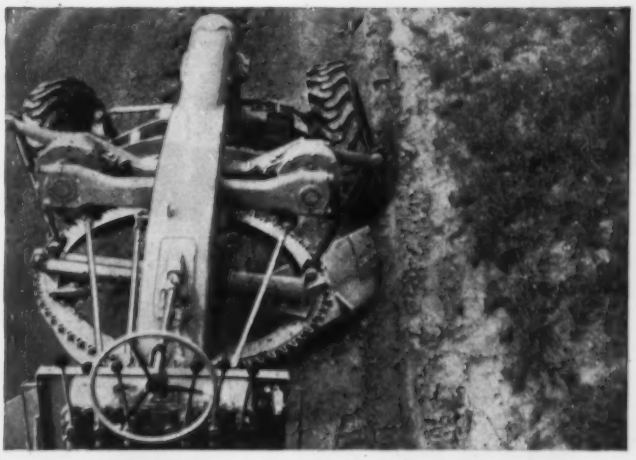

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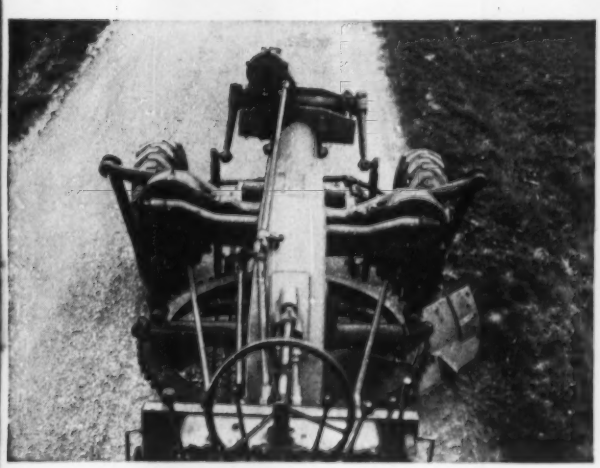

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Vol. 152, No. 7

NATIONAL AFFAIRS

ASCE to probe bidding for engineering services..... 21
Firm balks at permit fees on city job..... 21
Proposed federal-local hydro projects gain favor in Congress..... 22
Belgian authority criticizes U.S. concrete makers... 23
School costs: Educators told frame construction deserves greater consideration..... 23
Hell's Canyon debate has side issue..... 24
Largest lift-slab operation provides barracks averaging $8 per sq ft..... 25
Los Angeles sewage plans contested..... 26
Highway bills get fast action in Congress..... 27

FEATURES

TVA dambuilders turn to steam..... 30
Bolts speed factory erection..... 38
Wire-winding machine prestresses beams..... 41

MUNICIPAL

Oregon highway commission presents plan to modify Columbia River bridge program..... 44
Filter plant setback will delay Columbus, Ohio, water program a year..... 45

INTERNATIONAL

Inclined-arch bridge spans 250 ft over Mexico's Rio Blanco..... 46

MEN AND JOBS

Rudolph Christiani: He's honored on Christiani & Nielsen's 50th anniversary..... 48

BUSINESS AND FINANCE

Construction boom in New York State based on public, commercial work..... 57
New Fanny Mae: Housing bills give details on secondary mortgage plan..... 57
Pennsylvania Turnpike bonds are paid off far ahead of schedule..... 58
Activity this week..... 58

NEW PRODUCTS

Grader elevator moves 1,200 cu yd per hr..... 68
27-ounce electrode holder has high amperage capacity..... 72
Rock ripper features three-position control..... 72
Lightweight ladder hoist—a 1-to-3-story specialty.. 74
Plastic clamp speeds pipeline installation..... 74
Publications..... 76

Reader Comment..... 6
Calendar..... 12
Washington Observer.. 19
Weather..... 42
Obituaries..... 49
Construction Reports.. 50
Unit Prices..... 55
Editorials..... 80

THE CONSTRUCTION WEEK

BECK BURSTS BUBBLE—Dave Beck said "no" in Florida last week, and 18 lawyers and all members of his teamsters union executive board (to nobody's surprise) agreed. The teamsters won't go along with no-raiding pacts.

Thus died any practical hope for peace between AFL and CIO and their component unions—for Beck's "no" could be a declaration of war: both on AFL president George Meany and on all other unions in fields that Beck chooses to consider proper activity for his truckers.

Optimists among labor observers still could see some hope: They pointed to Beck's appointment of an official to work with the AFL's Building Trades Department in jurisdictional matters—figuring that the move meant a real chance for peace.

But Beck, who has a record of strike-breaking when his teamsters have been idled by squabbles of other unions, is showing little evidence of a desire for peace at any cost.

LICENSING POT BUBBLES—Efforts of a group of 34 corporations to amend New York State's engineer licensing law to permit corporate practice (ENR Jan. 7, p. 23) boiled down to three points: action in the state legislature; politicking, and public relations efforts among the state's engineers; a gamble on a vote.

Bills containing the proposed amendment (the Carlino-Milmoe bill) were already before legislative committees, with some last minute changes in wording in an attempt to meet objections. Politicking in the state was meeting some reverses—for instance, a resolution by New York City's powerful Building Trades Employers Assn., to oppose the change, after hearing proponents and opponents (the New York State Society of Professional Engineers)—and some gains like support of a leading engineering partnership.

The gamble was a postcard ballot sent out by the corporations, asking engineers to vote on whether or not they like the amendment.

COLLECTION PROBLEM—Kentucky's legislators had a good idea for producing added revenue for highway work—and acted on it. They okayed without dissent, a bill to collect gasoline taxes (seven cents a gallon) from big trucks that purchase their fuel outside the state but use it up in crossing the state.

Nobody commented on how to collect the tax.

HUMAN ENGINEERING—Engineers need to study humanities and social sciences—and the American Society for Engineering Education wants to know how best to teach them. With a $30,000 grant from the Carnegie Corp., ASEE will start a two-year study.

Cantilever Design and 'INCOR' Cut School Building Costs

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Columns form central corridor with cantilever beams at 17′-2″ centers extending out over exterior walls of classrooms. Small concrete ribs at right angles to beams carry precast, lightweight concrete roof slabs with excellent insulating and acoustical properties; ¾″ insulation was added to exposed ribs.

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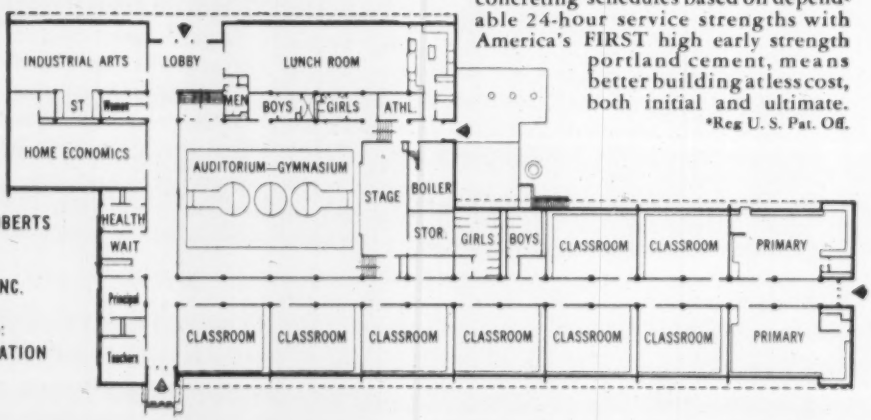

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WASHINGTON OBSERVER

Washington's political eyes are focused on a March upturn in business. Eisenhower has said flatly that unless the economic indicators take a turn for the better next month—unemployment, particularly—he's ready to take government action designed to add enough new zip to the economy too put people back to work.

New backing for Democratic charges that we are already in a recession came from a new method of counting the unemployed—which indicated that perhaps 728,000 more people are looking for jobs. In January, the old count had set the figure at 2,359,000—so the new figure now puts the unemployed over the 3,000,000 mark.

Windup of joint committee hearings on economic outlook were gloomy and all agreed that the President was right in his stand favoring a government move in the spring.

First action would be to give consumers a tax break—and most likely it would be a reduced withholding tax which would show up immediately in workers' pay envelopes.

Other actions would look to easier credit—and here's where housing fits in. Eisenhower has authority now to ease down payments and length of maturities on FHA-insured loans up to $12,000. But the new housing bill would give him power to go a lot farther in easing VA and FHA terms on housing in all price ranges.

Public works won't be a big factor in the first aids to business. Federal construction remains high, but figuring is that spending could be increased as much as 50% inside of a year's time. That's spending on projects either ready to begin or already under way.

New interest in anti-recession planning gives an added boost to the $10 million Eisenhower has in his budget for interest-free loans to states and cities for advance planning of public projects.

•

Recommendation on federal-state split of gasoline tax revenues probably won't be made until late fall. The firing of Clarence Manion, chairman of the Eisenhower commission surveying federal-state relationships is part of the story. Manion's political views were embarrassing the Administration—but another factor, apparently, was his failure to push the commission's work along. At any rate, the Administration now can make a better case for getting the commission's time extended—and thus put off until after election any stirring up of controversial question of splitting up the huge highway building revenues now being drawn from gasoline sales.

•

Army Engineers are pleading with Congress to reduce the scope of Agriculture Department's proposed upstream flood control and conservation program. The House has, ready for debate, legislation to permit Agriculture to build dams storing up to 5,000 acre-ft. Senate committee hearings now under way are aimed at limiting the jurisdiction. Engineer Chief Sturgis and other Corps witnesses propose the size of projects be reduced and that local interests be required to foot half the cost.

•

The Missouri River diversion dam just below Ft. Peck (ENR Feb. 18, p. 114) will be delayed. The House Appropriations Committee has asked the Interior Department to defer the award of contracts for construction of the dam until fiscal 1955's Reclamation money has been voted. Local controversy over the proposal is so hot that the congressmen want a solid majority for the dam before construction is ordered. About the best place to get sentiment is in this fall's election. A top proponent, Rep. W. A. D'Ewart will be up for reelection. A $25-million increase in Reclamation's 1955 budget is being backed by the Administration. The money is for six new starts in the Missouri River Basin.

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ASCE to probe bidding for engineering services

Atlanta convention also focuses attention on unionization issue; technical papers deal with key projects in Southeast

The American Society of Civil Engineers will investigate participation by a number of its members in bidding for design of a South Carolina bridge in violation of the ASCE code of ethics (ENR Nov. 19, 1953, p. 167).

This decision by the ASCE Board of Direction—plus action to counter attempts by craft unions to enlist engineers in their ranks—made discussion of professional matters a highly significant aspect of the ASCE's winter convention in Atlanta, Ga., last week.

Listening to technical papers, the 700 engineers attending the convention were brought up-to-date on significant projects in the Southeast and particularly in Georgia.

• **The bidding question**—The ASCE board, concurring in a recommendation by its committee on professional conduct, ordered the executive-secretary to address a written inquiry to those members who appear to have submitted bids to the South Carolina Highway Department in its call for engineering services on the design of a bridge.

The committee reported that its own preliminary investigation had indicated that a number of ASCE members did participate in the bidding in violation of the society's code of ethics.

After results of the inquiries have been evaluated, it is the committee's plan to make appropriate recommendations to the board. In order to keep the membership informed as fully as possible, the board ordered that a statement on the basic facts be published in the society's magazine, CIVIL ENGINEERING.

• **Education and unionization**—The board appointed a joint committee consisting of three members each from its engineering education and technical procedures committees to study engineering school curricula and their adequacy in meeting modern needs of scientific education.

Decision to pay more attention to unionization drives was prompted by a report of the committee on employment conditions presented by its chairman, James I. Ballard, editorial director of WESTERN CONSTRUCTION. The report re-emphasized the previously announced results of a questionnaire survey of the membership. Of 17,200 who answered, 40% had no objection to collective bargaining and 25% said that it would be of advantage to them.

The committee was impressed with the high rate of acceptance among junior members. "If these young men are to resist being lured or forced into craft unions, positive countermeasures in the form of collective bargaining groups, at the professional level, must be taken to assist them," said the committee.

It recommended the reading of a recent memorandum entitled "Engineers, Unionization and Tax Status of ASCE" by W. N. Carey and E. L. Chandler of the society's staff as providing the first step in acquainting members with the basic moves required to form collective bargaining groups at the professional level. In addition, "in the light of new evidence of craft union encroachment" the board was urged to provide "as promptly as possible detailed information to the membership relative to the courses of action available to them: (1) In cases where the Taft-Hartley Act applies and (2) in cases beyond the coverage of the act."

• **Seven Wonders of Georgia**—Not long ago, the members of the Georgia section picked out seven of the state's engineering wonders as candidates in a society plan to publicize U. S. engineering achievement. They were Clark Hill Dam, the Eugene Talmadge Memorial Bridge at Savannah, the Georgia Power Co. system, Buford Dam on the Chattahoochee River, the Lockheed Aircraft plant at Marietta, the Union Bag & Paper Co. plant at Savannah and the Atlanta expressway system. Several of these were subjects of papers at the convention.

The Talmadge bridge, currently under construction at Savannah, will

(*Continued on page 22*)

Firm balks at permit fees on city job

In an apparently unprecedented action, Miami, Fla., city officials are demanding that a contractor on its $22-million sewage treatment plant pay the city's regular permit fee or get off the job.

Work may be halted on the project as a result of refusal of the Paul Smith Construction Co. of Miami, holder of a $9.2-million treatment plant contract, to take out a permit, and pay fees totaling $28,000.

The firm contends it should not be required to pay fees for doing city work. The city attorney's office has countered with the statement that permits are waived only for force account work by federal, state, county and city governments. It has told the Smith firm that exempting it from fee payments would be unfair to other contractors who bid on the job.

A spot check ENR survey of several major cities indicates that the Miami action runs counter to usual procedure—a compulsory filing of plans for a permit but a waiving of fees.

Here's what the survey shows:

• New York City requires permits on all construction, but it waives permit fees.

• Seattle, Wash., charges no fees for sewerage work but requires permits be obtained.

• Houston, Tex., reports that permit fees are waived on all city jobs.

• Detroit contracts for municipal projects stipulate that permits issued by the city will be furnished without cost to the contractor. If in the course of the work, the contractor decides to employ a construction method that would require obtaining a special permit (like hooking into a city fire hydrant for his water supply) he pays that permit himself.

• Philadelphia leaves its permit procedure up to the department or agency handling the job. Technically, no jobs are exempt, but many of the projects under construction for city departments are not covered by permit, and therefore are not subject to payment of fees. The system makes inspection difficult, and inequities of the situation have been recognized.

• San Francisco waives payment of fees by contractors on street and sewage construction, but does exact fees on building permits covering construction of public buildings such as schools and firehouses.

. . . ASCE to probe bidding

provide a new crossing over the Savannah River into South Carolina. The structure, described by Alfred Hedefine of Parsons, Brinckerhoff, Hall & Macdonald, consulting engineers of New York, is 6,000 ft long and part of an eight-mi toll project. The main structure over the river is a through truss cantilever, with short (about 280-ft) anchor spans and a 710-ft main span providing 135-ft channel clearance. Such an arrangement permitted economical steel sections, and further economy is effected by using an open steel grating floor. Sway bracing economy and effectiveness are enhanced by a square panel arrangement made possible by using truss panel lengths equal to the width of the bridge between trusses, 35 ft. The bridge will be Georgia's highest and most costly.

Buford Dam, under construction 35 mi northeast of Atlanta, was described by Carl E. Bentzel, engineer of the Mobile district of the Corps of Engineers. The multi-purpose project involves an earthfill of about 5,000,000 cu yd. The river is being diverted through a tunnel and 250-ft-deep cuts, the latter to serve eventually as the forebay and tailrace for the power plant in which will be installed two 40,000 and one 6,000-kw generators. Excavated material from the tunnel and the cuts will furnish a necessary 500,000 cu yd of rock for a heavy upstream blanket on the dam. The main dam contract was awarded last week for $1.8 million.

Described in papers by Moses E. Cox, engineer of the Joint Bond Commission, which coordinates city-county activities, and Karl A. Bevins, traffic engineer of the city, the Atlanta expressway system centers on a loop around the business district, with arms extending south, east, west, northeast and northwest. Most of the system will be four-lane, but there are four miles of six and one-mile of eight-lane expressway in the downtown area. Hollow girder concrete rigid frames are being used for some of the bridges, the first use of this type of construction in the Southeast. City and county are spending an initial $16 million on the road.

• **Water problems**—On the front of general technology, two papers on water were outstanding. One was a discussion of the national water policy problem by Dean Thorndike Saville of New York University; the second, an analysis of the possibilities of converting salt to fresh water through a process known as electrodialysis, by Prof. Rolf Eliassen of M.I.T.

• **Few of many**—Dean Saville, noting the difficulties of securing quick agreement on many of the facets of the water problem, urged concentration on the few that offer the best possibility of unanimity of opinion. Thus, he thinks that a single federal agency charged with data collection and publication, research and experimentation would find support. He believes that Congress could be persuaded to make federal policy—as applicable to federal projects—uniform with respect to evaluation, cost allocation and payment by beneficiaries. Also that Congress would adopt a policy limiting the federal government to handling only those projects that private capital or local governments could not undertake.

Possible but more difficult, said Saville, would be development of state water agencies with similar functions and powers so that cooperation among them would be easier and so that state autonomy on water projects would be fostered. And he supported the idea of a federal board of review, charged with approving federal projects and with cooperating closely with the state water agencies.

• **Salt to fresh**—Prof. Eliassen described the conversion of salt water to fresh water by the method known as electrodialysis as "very exciting" in that it "brought within our grasp" a practical means of achieving this long desired result. Electrodialysis uses electrical forces to pull cations and anions (positively charged sodium and negatively charged chlorides, for example) through two types of semipermeable plastic membranes, leaving the fresh water behind. One type of membrane permits cations to pass through, another type the anions.

Ionics, Inc. of Cambridge, Mass., has built several experimental units, which Prof. Eliassen reported operate with "entire success." The process is more economic on brackish water than on sea water of high salinity.

As to costs, a study covering a flow rate of 275,000 gpd showed that a 2,000-ppm chloride content could be removed for about 32 cents per 1,000 gal, and a 5,000-ppm content for about 55 cents. For a 20,000-ppm concentration, the cost would be about $1.30 per 1,000 gal, which is roughly about the same as for the distillation method.

Prof. Eliassen estimated that a 1-mgd plant, designed to reduce salinity from 4,000 to 400 ppm, could be built for $3,000, and operated at an average cost of 60 cents per 1,000 gal.

Power partnerships

Proposed federal-local hydro projects are gaining favor in Congress

Policy of local-federal participation in water power development is not entirely a new one, but President Eisenhower has given it new impetus this year.

Three bills are in the legislative mill to permit the federal government to join with local and state agencies to build specific projects with power features.

House Interior and Insular Affairs Committee is considering a measure which would permit the Secretary of the Interior to cooperate with non-federal agencies in development of multi-purpose projects.

• **Cougar project**—President Eisenhower recently endorsed the proposed approach to the Cougar project in Oregon which would make the 35,000-kw hydroelectric job a joint venture between the Army Corps of Engineers and the city of Eugene. The Corps would build the $34-million project except for the powerhouse and generators. The city of Eugene would build the power features and pay a fair share on other features of the project which contribute to power production.

Priest Rapids bill—Legislation is much further along to permit state agencies in Washington to join with the federal government in developing the vastly larger Priest Rapids project on the Columbia River.

The project, with an installed capacity of around 1,000,000 kw, could be built either by state agencies or the Corps of Engineers. The federal responsibility would relate to navigation locks and flood-control features. The state-backed agencies would operate the power features.

The Priest Rapids project would cost an estimated $360 million. These plans call for a dam for developing a 150-ft head and an installed capacity of 1,200,000 kw.

• **Markham Ferry**—Another similar project already has passed the Senate and is slated for House debate within the next few weeks. It provides for state construction of the $40-million Markham Ferry Dam on the Grand River in Oklahoma.

The federal government would contribute as much as $6.5 million for flood-control features of the project. Existing plans call for an initial installed capacity of 36,000 kw and an ultimate installation of 72,000 kw.

ENR photo by Compton

PROF. GUSTAV MAGNEL, of Belgium, to Concrete Industry Board of New York City: "U. S. contractors are poor concrete makers."

"U. S. makes soup instead of concrete"

U. S. contractors make a fetish of saving labor on construction, and manufacture soup instead of concrete. That is the principal reason for the slow progress of prestressed concrete here, according to Prof. Gustav Magnel, of the University of Ghent, Belgium, who has designed notable prestressed concrete structures abroad.

Completing a lecture tour of the U. S. and Canada, Prof. Magnel last week summarized his observations at a meeting of the Concrete Industry Board of New York City.

While it is true that building codes are holding back prestressed concrete, he said, a bigger drawback is that U. S. contractors are poor concrete makers. The high slump, low-strength concrete they produce in their anxiety about saving labor may be adequate for ordinary reinforced concrete, but not for prestressed concrete, for which high strength is desirable. In Belgium, no-slump concrete is used.

Actually, Prof. Magnel claimed, though labor may be saved by making poor concrete, overall cost may be higher because of rejects and the expense of patching.

• **Criticizes U. S. type of mixers**—He went on to say that good no-slump concrete could not be made with the horizontal-axis type of mixer in general use in the U. S. He recommended the "Irish," or vertical-axis type. (Internal paddles rotate about one axis, while the inclosure rotates about an axis in a different location in the opposite direction.)

Prof. Magnel also offered answers to two questions frequently asked him on his lecture tour:

• Is lack of a specification for prestressed concrete holding back progress? He recommended that no attempt be made at present to develop a full specification, so as to avoid placing barriers in the path of new development. But it would be all right to write requirements for some items, like allowable unit stresses and properties of materials.

• How fire resistant is prestressed concrete? He referred to tests that indicated that when the tendons have adequate cover prestressed concrete is more fire resistant than reinforced concrete.

• **Belgian failure insurance**—There is in Belgium an organization known as SECO—Bureau de Controle pour la Securite de la Construction in Belgique—which Magnel was instrumental in forming about 19 years ago. When requested, SECO will insure a newly built structure against defects for 10 years; that is, it will pay the cost of repairing or replacing defective components. But the organization will do this only if permitted to control every phase of the job—check calculations, correspondence of calculations and plans, bearing capacity of piles and soils, and suitability of materials. It also supplies field inspection and supervises special work, such as the prestressing of concrete beams. For this, SECO charges a fee—for example, 1.6% to 1.8% of construction costs for a $1-million project—which is paid by the owner.

School costs

Educators told frame construction deserves greater consideration

School executives, hard-pressed for adequate school facilities, were urged last week to give more consideration to sprinklered frame buildings.

The case for wood construction—conditioned on areas being termite-free—was presented at the 80th annual convention of the American Association of School Administrators in Atlantic City, N. J., by Alonzo J. Harriman, Auburn, Me., architect. More than 16,000 educators and school executives attended the AASA sessions.

Defending wood construction, Harriman said that the soundest school investment is a sprinklered frame building which ought to last 50 years, provided, of course, that the region has no termites.

• **Expensive walls**—The exterior wall is the most expensive of all the building components, except mechanical equipment, and is also the most variable, Harriman explained. In a cold climate, the perimeter affects the first cost as well as later operation costs, since heat loss varies with the exterior area.

Harriman stressed that it always has been an axiom among building contractors that the cost of a building is not determined by entirely what it is built of, but also by what it is covered with. He added, "No structural system can make a tremendous saving, because the structure is only approximately 15% of the building cost."

• **Don't build monuments**—Citing the frequent propensity of the school committee to build a monument, Harriman told the convention that instead of this school boards should be sold on the idea of getting the most for their school dollar, and of accepting equal or better substitutes for what they had in the past.

He urged school planners not to waste money on architectural style, towers, or ornaments of any sort.

On the subject of prefabrication, Harriman said that it will not be long before stock prefabricated classroom units will be available. "The trend in this country is towards prefabrication as one sure means of cost reduction."

Convention sessions were also held on designing school buildings to serve community needs, financing construction and alteration of schools in federally impacted areas, and on reducing costs in school construction. The latter session gave extensive consideration to the problem of outmoded and conflicting building codes.

Hell's Canyon debate has side issue

While one dam vs three at main site is debated before FPC, alternate downstream developments are studied

While the Federal Power Commission's hearing on Idaho Power Co.'s application for developing Hell's Canyon drones along with a decision still weeks away, the equally important question of downstream development is getting some attention.

The Corps of Engineers and the Bureau of Reclamation have just reported to Congress their ideas on downstream projects—ideas that would add more than 1,400,000 kw to the proposed big hydro scheme on the Snake River in Idaho.

• **Shift to two dams downstream**—Preliminary findings in the bureau's report indicate a shift from the previously proposed high dam at Mountain Sheep to a two-dam plan—a low one at Mountain Sheep, and a higher arch dam near Pittsburg Landing 20 mi upstream. These dams together would develop the 560-ft head of the 50-mi stretch, formerly contemplated for the single high dam.

Reclamation turned around on its Mountain Sheep one-dam proposal after additional drilling and tunneling of the two abutments—plus interpretation of site data by geologists—showed that construction of a high dam would cost much more than previously estimated.

• **Needs extensive survey**—Further examination of potential sites near Pittsburg Landing indicated both economic and engineering advantages for the two-dam plan. But, the report makes clear that evaluation of the plan would require foundation exploration and design studies as extensive as those made for the Mountain Sheep site.

Plans for the two-dam concept assume development of Hell's Canyon itself, with either three low dams or a single high dam. Federal Power Commission hearings are moving gradually toward a decision on the Idaho Power Co. application for run-of-river plants at the Hell's Canyon and Oxbow sites, with a third plant and a 1,000,000 acre-ft reservoir upstream at the Brownlee site. Being considered in these hearings is the alternate proposal for a federally built high dam at Hell's Canyon involving up to 3,880,000 acre-ft of storage capacity.

The proposed two-dam development below Hell's Canyon would include a concrete gravity dam and power plant at Mountain Sheep to develop about 158 ft of hydraulic head and a concrete arch dam with power plant at or near the so-called Pleasant Valley site, not far from Pittsburg Landing to develop an additional 402 ft of head.

• **880,000 to 1,020,000 kw**—With an upstream storage capacity of 1,000,000 acre-ft, the power installation under the two-dam plan would be 880,000 kw—630,000 at Pleasant Valley and 250,000 at Mountain Sheep. With 3,880,000 acre-ft of upstream storage capacity, the two-dam power installation would total 1,020,000 kw, made up of 720,000 at the upper site and 300,000 at the lower.

Depending on the amount of upstream storage, the regional office estimated the average annual power output at 4,200,000,000 to 4,500,000,000 kwh. Highly tentative cost estimates, based on incomplete foundation data, show that the two-dam combination of dams and power plants would cost about $300 million to $320 million, depending on the size of the power installation.

Using the tentative cost estimates, the regional office made a financial analysis that indicated a benefit-cost ratio of about 1.5 to 1.0 for the two-dam plan.

Need for further studies was emphasized by the regional director, Harold T. Nelson. Depending upon detailed investigations in the vicinity of Pittsburg Landing, he recommended in his report, for example, that a dam at Mountain Sheep to develop 200 ft of head, with another at the so-called Corral Creek site to develop 360, should be considered.

• **Salmon River diversion**—Also to be studied, he notes, is the inclusion of a diversion dam and tunnel to bring surplus Salmon River water to the upper reservoir of the two-dam program. This diversion offers possibility for maximum development of water resources under the Mountain Sheep two-dam plan. Thus it would eliminate consideration of the alternate Nez Perce site below the mouth of the Snake River—objectionable to fishing interests because it would block salmon migration.

• **Army Engineers report**—With the Reclamation regional office document, the Army Engineers sent to Congress a report by its district and division engineers on investigations of the Snake River and tributaries above Lewiston, Idaho. This report speaks favorably of two large multi-purpose projects on the forks of the Clearwater River. However, recommendations are still to be cleared by the Board of Engineers for Rivers and Harbors before being considered for formal recommendation by the Chief of Engineers.

The two projects would have a total power installation of 532,000 kw and would add about 4,700,000,000 kwh of firm energy to the Pacific Northwest power supply, the report indicates.

One multi-purpose site recommended in the report is at Bruces Eddy on the North Fork of the Clearwater. This project calls for a dam of 570-ft effective height, with 1,433,000 acre-ft of usable storage. Installed power would be 240,000 kw, and the estimated total cost is $117.5 million.

The second and larger project recommended is at Penny Cliffs site on the Middle Fork of the Clearwater. This dam would be 590 ft high and would impound 2,300,000 acre-ft of usable storage. The power installation would be 292,000 kw. Total cost of the project is estimated at $191.7 million.

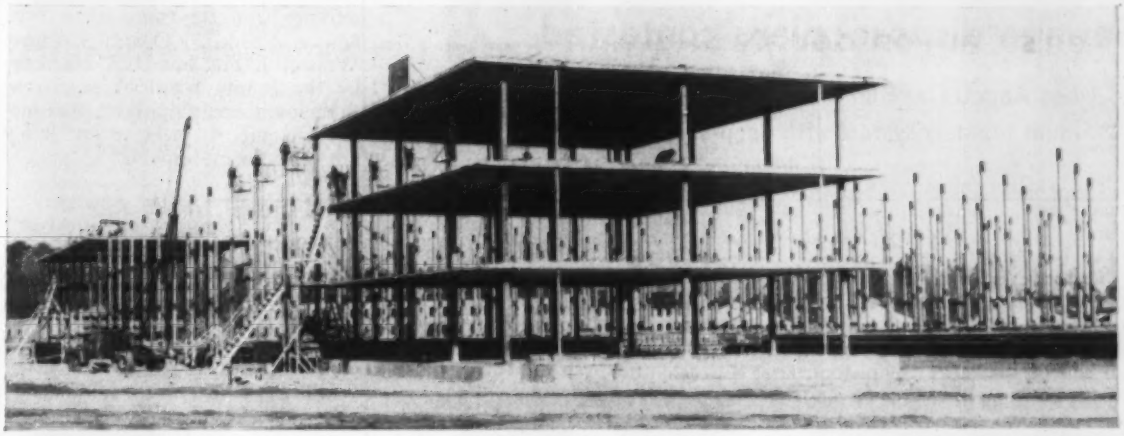
Toll highway surveys begun in three states

Contracts have been let for engineering surveys on Kentucky's projected $30-million Louisville-Elizabethtown toll road, and for an appraisal of toll highway proposals in Illinois and Wisconsin.

Four engineering firms will work on plans for the 40-mi turnpike in Kentucky. Overall supervision has been assigned to Howard, Needles, Tammen & Bergendorf, Kansas City, Mo. Working on three sections of the route will be Hazelet & Erdal, Louisville; Tecon Engineering Co., a Texas firm with an office in Louisville; and Gillig, Watkins & Wilson, Lexington, Ky.

The New York firm of Coverdale & Colpitts has been engaged to make a traffic and earnings study of the proposed Wisconsin turnpike, which would link Chicago and Minneapolis. The state highway commission will participate in the survey.

Joseph I. Knoerle & Associates of Chicago have been selected to undertake a pre-preliminary survey of toll highway prospects in Illinois. This survey, according to Evan Howell, chairman of the Illinois State Toll Highway Commission, will entail a study of possible road locations. The report also will contain recommendations as to construction priorities and indications of traffic and revenue potential.



FOREST OF COLUMNS will support the lift-slab floors and roof of a 1,500-man, six-wing barracks at the Navy's Little Creek Amphibious Base in Virginia. Each slab is lifted on 12 columns, measures 53x76 ft and weighs 225 tons.

Largest lift-slab operation provides barracks averaging $8 per sq ft

Shaped like two E's back-to-back, a new six-wing, three-story barracks, nearing completion at the Navy's Little Creek Amphibious Base, near Norfolk, Va., represents the largest application of lift-slab construction on record. Cost of the 1,500-man building is $1,721,455 or $8.00 psf for its 215,000-sq ft gross floor area, including 3-ft overhang. Frontage of the building is 477 ft and its total depth is 303 ft.

Another barracks under construction at the Little Creek site—a 900-man, three-story structure costing $1,038,670—is going up by lift-slab, and a third, 600-man, three-story building estimated at $750,000 is due to start next month under the same technique. Engineers estimate that the lift-slab method saved almost $150,000 in construction costs for work on the 1,500 and 900-man barracks.

Cost per man on the first two barracks is $1,150. Previous Navy low figure per man for barracks construction was $1,350, and it has been as high as $1,950 per man.

• **Labor saver**—Cost reductions resulted from elimination of bottom forms (the slabs were cast one on top of another at first floor level), and obviating the necessity of raising lumber, reinforcing, ducts, pipe, and concrete to make the slab at its final height. The method made it unnecessary to use a large crew of carpenters for making forms and shoring slabs as in usual methods of construction. Time and labor were saved by raising windows, doors, and prefabricated partitions on the slab itself.

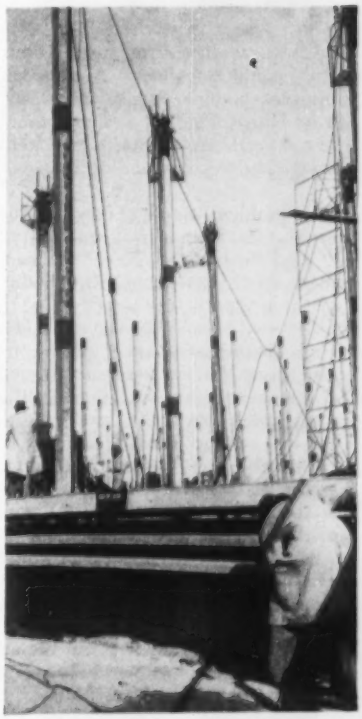
The barracks are built on foundations of cast in place piles supporting footings for the steel columns. Spaced transversely 22 ft on centers and longitudinally 20 ft on centers, the columns are formed of two 8x8x½-in. angles.

• **Work at ground levels**—After columns were erected, piping, ducts, sleeves, reinforcing, and side forms were placed for the first floor and the slab was poured. The first floor slab was allowed an 18-hr set and then was mopped with paraffin-based parting agent. Cast steel lifting collars were placed around columns for the three lift-slabs, and the second floor slab—bottommost lift-slab—was formed and poured in the same manner as the first. Individual lift-slabs measured 53x76 ft and took in 12 columns on which they were lifted.

When all the lift-slabs had been placed, cured and stripped, a hydraulic jack was placed on the top of each column. Two threaded rods were placed on either side of the column and fastened by lugs beneath the topmost lift-slab lifting collar, and the lifting of the slab was begun. Each jack was operated automatically from a control cabinet or console which can operate 12 to 14 jacks at once. Rate of lift is approximately five feet per hour.

After the slab has reached its design elevation, steel blocks are welded to the columns immediately below the collars to support the slab. When topmost slab was in position, lugs were removed from threaded rods and they were dropped down through lifting collars in order to raise the next slab.

Reinforcing in the floor slabs conforms with principles of normal reinforced concrete flat-slab design. Second and third floor slabs are 9 in. thick and the roof slab is 7½ in. thick. Floor-to-floor distance for the first and second stories is 11 ft and for the third story 10 ft 10½-in.



SQUARE STEEL COLUMNS have jacks poised on top to raise the three lift-slabs.

Contractor for the barracks is the Lang Construction Co., Hampton, Va. Architects are Woodward, Oliver and Smith, Norfolk, Va., and engineers are Fraioli-Blum-Yesselman, New York, N. Y. Lift Slab, Inc., San Antonio, Tex., carried out the raising of the floor slabs. Knappen-Tippett-Abbett-McCarthy, New York, N. Y., have the overall A&E contract for the Little Creek development.

Sewage disposal plans contested

Los Angeles will hold hearings on issue of complete treatment plant vs system with deep-sea outfall

The issue of primary sewage treatment (with dispersion of effluent at sea) vs complete treatment has flared up in Los Angeles.

Two experts are at odds over which system could better serve the city's long-term needs. One is City Engineer Lloyd Aldrich, who favors expansion of the city's complete treatment plant. The other is A M Rawn, author of a plan by County Sanitation District No. 2 for deep-sea outfall.

So the question that has been kicked around for some time without an answer (ENR Aug. 21, 1952, p. 32) now has two answers—but sharply conflicting ones. And, in an effort to resolve the controversy, Mayor Norris Poulson has appointed a 23-man citizens' committee to hold hearings and recommend action.

• **The problem**—Sewage flow in the Los Angeles system is estimated at 420 mgd for the year 2000. All concerned seem to accept this figure. Right now flow is very nearly equal to the 245-mgd capacity of the city's Hyperion treatment plant. And the geometry of the sewer system is such that at some peak load periods the lines cannot carry the entire load. Thus raw sewage must be allowed to run into the Los Angeles River some 20 mi from Hyperion. A main trunk line to the San Fernando Valley will remedy the raw sewage discharge at least for a while. And bids have been opened for construction of settling tanks that would prevent overflow from the trunk sewer to the river.

A 1952 Metcalf & Eddy report recommended a sedimentation plant at a Los Angeles River site with treated effluent discharged to the river and other matter returned to the sewers for treatment at Hyperion. This has been rejected on esthetic grounds.

• **Rival reports**—In July 1953, City Engineer Aldrich recommended a $39.5-million, five-year program that includes both additional trunk sewers and expansion of Hyperion.

Meanwhile, it was decided to explore the feasibility of contracting for discharge of part or all of the flow to the county system. The city council entered into an agreement for a feasibility study of such a move with County Sanitation District No. 2—one of 16 districts handling flow from cities and unincorporated areas in Los Angeles County. Rawn is chief engineer and general manager of District No. 2.

The reports differ widely both in general and in specific details. The county has successfully operated a system with flow now greater than 150 mgd that includes these elements: high-rate primary treatment (sedimentation and chlorination), sludge digestion with open air sludge drying, and deep-water ocean discharge of effluent. Water depth of two outfalls has been 100 ft; one outfall has just been extended to a 150 to 165-ft depth (ENR Dec. 24, 1953, p. 38).

The city's system, on the other hand, includes these steps: high-rate activated sludge treatment, sludge digestion followed by elutriation, vacuum filtration, and artificial heat drying of the sludge, and discharge of treated effluent into a 50-ft. water depth a mile off-shore.

The Rawn report says that if open air sludge drying becomes impracticable in the future, digested sludge probably can be discharged by the outfalls or through lines to great ocean depths.

Aldrich counters by citing beach pollution in the county outfall area. He also offers evidence of shellfish bed damage by sludge accumulation near the county outfalls. But he admits that no state agency has become sufficiently alarmed to take action to curb contamination, he alleges.

• **Economics**—The two engineers differ widely on costs. The least expensive of several plans detailed in the Rawn report is pegged at a cost of $22 million. (This would divert 153 mgd of the city flow to the county with 293 mgd still going to Hyperion.) Aldrich says the cost should rightly be $32.7 million and that facilities set at an additional $11 million would also have to be built.

At this stage it is not clear what the mayor's 23-man citizens' committee can accomplish. The group is headed by George P. Gose, general counsel for Pacific Mutual Life Co. Membership is almost entirely a lay group with the exception of Milton J. Brock, contractor; Ralph U. Fitting, consulting engineer, and Joseph Jensen, board chairman for the Metropolitan Water District of Southern California.

Meanwhile award of a $317,748 bid by Peter Kiewit Sons Co., and Fred J. Early Co. on a temporary settling basin for trunk sewer overflow is clouded. County Engineer William J. Fox has been instructed by the county board of supervisors to oppose the city's project. Fox may have an alternate scheme but it has not yet been made public.

Sand-gravel, ready mix convene at Chicago

Officers for the National Sand and Gravel Assn., and the National Ready Mixed Concrete Assn., were named last week at the 5-day joint annual convention in Chicago.

Officials named for the NSGA were: John W. Murphy, Union Sand & Gravel, Spokane, Wash., president for 1954; Roy E. Weaver, Lincoln Sand & Gravel, Lincoln, Ill., vice president; and E. Phil Gemmer, Texas Construction Material Co., Houston, Tex., secretary-treasurer.

Robert C. Collins, Warner Co., Philadelphia, Pa., was named president of NRMCA, and for first vice-president, Louis C. Schilling, I. E. Schilling Co., Miami, Fla.; second vice-president, Robert Mitchell, Consolidated Rock Products Co., Los Angeles, Calif., and treasurer, John W. Roberts, Southern Materials Co., Richmond, Va.

Wage recommendation cut for work on Oahe reservoir

The Labor Department in an unusual Davis-Bacon Act ruling has reduced by 22 cents an hour the top wage rate that can be paid for work on the Oahe reservoir project near Pierre, S. D.

Rep. E. Y. Berry said he has been informed by department solicitor Stuart Rothman that he has reversed a hearing examiner and set the maximum rate at $2.33 an hour and the minimum at $1.66.

The examiner's recommendation of a maximum of $2.55 had been appealed by state groups who contended it would set wage rates higher than the prevailing level.

Berry said that Rothman told him this was the first time he had reversed a hearing examiner's recommendation and added that it was most unusual for the department to scale down such a recommended wage rate.

Colorado to build tunnel

Colorado's state highway commission has been authorized to finance construction of a $16-million toll tunnel through the Continental Divide. The action came after Gov. Dan Thornton warned the legislature that future transcontinental toll roads might bypass Colorado.

Highway measures get fast action

Administration-backed McGregor Bill nearly ready for House action as preparatory work on legislation pays off

Highway legislation is moving fast in Congress. House hearings on the McGregor Bill (see table) were concluded in three days, and the Senate committee held a surprise hearing to get testimony from Alfred E. Johnson, president of the American Association of State Highway Officials.

The House Public Works Committee was to meet in executive session this week to mark up the McGregor Bill and then report it, after which the Rules Committee is expected to put the bill on the calendar for the near future. There is good prospect of fast House action to pass the bill as introduced.

All this is the result of diligent preliminary work. As noted (ENR Feb. 11, 1954, p. 27), McGregor had advance concurrence of the Administration, congressional highway leaders and national highway groups for his proposed legislation.

• **Administration backing**—At House hearings, the Administration went down the line for the McGregor Bill with few minor changes. The Budget Bureau endorsed the bill and said specifically that $200 million for the interstate system and a two-cent gas tax are required. However, it recommended the 50-50 matching of funds for interstate projects.

Francis V. du Pont, head of the Bureau of Public Roads, concurred in supporting what now is frankly an Administration-adopted measure. Generally, with few exceptions, other witnesses endorsed the bill. There was little or no controversy over money amounts proposed.

Danger signals of possible trouble showed up on questions regarding the following points:

• The proposal to give the states supervisory control over the secondary system;

• The formula for apportioning interstate funds;

• The matching ratio for interstate system construction;

• The proposed study of utility relocations and federal payment for those relocations.

On the question of paying the states for secondary system construction upon state certification that the work has been completed to state standards, a couple of committee members wanted to know whether this change might later open up all federal-aid systems to the same state control, free from BPR supervision.

Du Pont explained that there is no such intent; the purpose, he said, is to reduce BPR supervisory overhead and to pass more responsibility over to the states.

• **Utilities want help**—Utility people—private and public—made strong demands at the hearings for federal payment of utility relocation costs on federal-aid projects. These groups—telephone, municipal, electric power, etc.—have been urging congressmen for months to vote them this compensation.

Committee members got admissions from them that their utilities are on highway right-of-way only by agreement and by sufferance—that they have no ownership rights of any kind in the right-of-way. But the utility spokesmen maintained that the right-of-way is for public service, as much for their lines and customers as for highway use.

• **Funds in highway bills**—Amounts proposed to be authorized for federal aid in the legislation now before Congress are shown in the accompanying table, set over against the recommendations that were presented by the American Association of State Highway Officials.

The AASHO recommended that funds for the primary, secondary and urban systems be apportioned to the states according to the long-established formula (one-third each for area, post-road mileage and population) to be matched on a 50-50 basis. For the interstate system, however, it proposed that funds be apportioned on the basis of the ratio of each state's population to the total population, and that the matching be on a 75-25 federal-state basis.

The Case Bill follows substantially the same pattern except that a 60 federal-40 state matching for the interstate system is proposed. This would include $100 million of the $360 million allocated to the primary system under the Case Bill, which must be spent on roads of the primary system that also are part of the interstate system.

Representative McGregor's bill provides that all but $100 million of the $800 million assigned to the federal-aid system be apportioned to the states on the regular federal-aid formula. The $100 million, however, is to be apportioned to the states on the basis of population.

Proposed federal aid for highways

(For fiscal years beginning July 1, 1955 and July 1, 1956)

Type of highway	AASHO recommendations	Case bill S. 2859	McGregor bill H.R 7818
Interstate system	$250,000,000	$ 35,000,000	$200,000,000
Primary system	292,500,000	360,000,000*	270,000,000
Secondary system	195,000,000	240,000,000	180,000,000
Urban system	162,500,000	200,000,000	150,000,000
Subtotal: Federal-aid systems	**$900,000,000**	**$835,000,000**	**$800,000,000**
Forest highways	No specific amounts. Proportionate increases recommended over amounts authorized by 1952 act.	30,000,000	22,500,000
Forest roads and trails		30,000,000	22,500,000
Park Service roads		15,000,000	10,000,000
Parkways		15,000,000	10,000,000
Indian reservation roads		15,000,000	10,000,000
Subtotal: Forest and park roads		**$105,000,000**	**$75,000,000**
Inter-American Highway		8,000,000	8,000,000
Rama Road (Nicaragua)		2,000,000	4,000,000
Public-land roads		2,000,000	.....
Defense access roads		50,000,000	.....
Miscellaneous		250,000	.....
Subtotal: Other roads		**$62,250,000**	**$12,000,000**
Grand total	**About $1 billion**	**$1,002,250,000**	**$887,000,000**

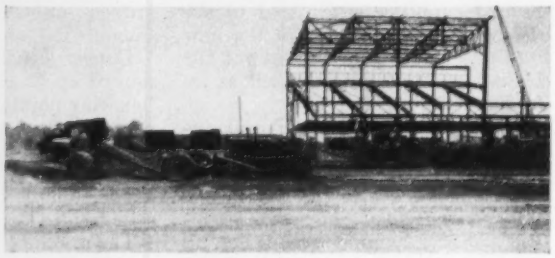
*Of this amount, $100 million must be spent on the interstate system, which is part of the primary system.

(*Advertisement*)

Pictures of the month... *by LeTourneau-Westinghouse...*

Cheaper than tracks — Wagner Quarry's Tournatractor handles limestone stripping, stockpiling, odd jobs on 150 acres in Ohio. In 18 months (2000 hrs) of year-round work, unit has been 98% mechanically efficient. Says W. J. Sprow, General Manager, "It's cheaper and faster to run on rubber than on tracks. Our 1 Tournatractor has replaced 2 crawlers."

Licks swamp and sand — Sand and swamp hold no fears for Mike Stiriz of Patchogue, N. Y. His C Tournapull loads 14 pay yds of highly abrasive sand, has no trouble filling over swamp for extension of Sunrise Highway at Oakdale Station.



5,000 yds per day — Grading 150,000 yds for a ½-mile trotting track in Delaware, 5 C Tournapulls average 5,000 yds per day for the Brandywine Raceway Assn. Job Foreman says one Tournatractor-pusher (right) has kept all 5 Tournapulls going on 600 ft one-way hauls. When hauls are shorter than 600 ft, or material tougher than usual, a crawler-pusher helps out.

50 yards per minute — 2,500 pay yds of wet sandy loam per hour was the exceptional output that finished a 4,000,000-yd, 1,000-acre expansion of McGuire Air Force Base in New Jersey in 8 months. Ten 16-yd C Tournapulls like the one shown above, one 27½-yd Tournapull, and seven 17½-yd Tournapull-type rigs accounted for this 50-yard-a-minute production rate on 1,000 to 2,000 ft hauls. Contractor on the $3,500,000 job was Yonkers Contracting Co, a subsidiary of Edward J. Petrillo, Inc.

(Advertisement)

. . . with performance reports from around the world

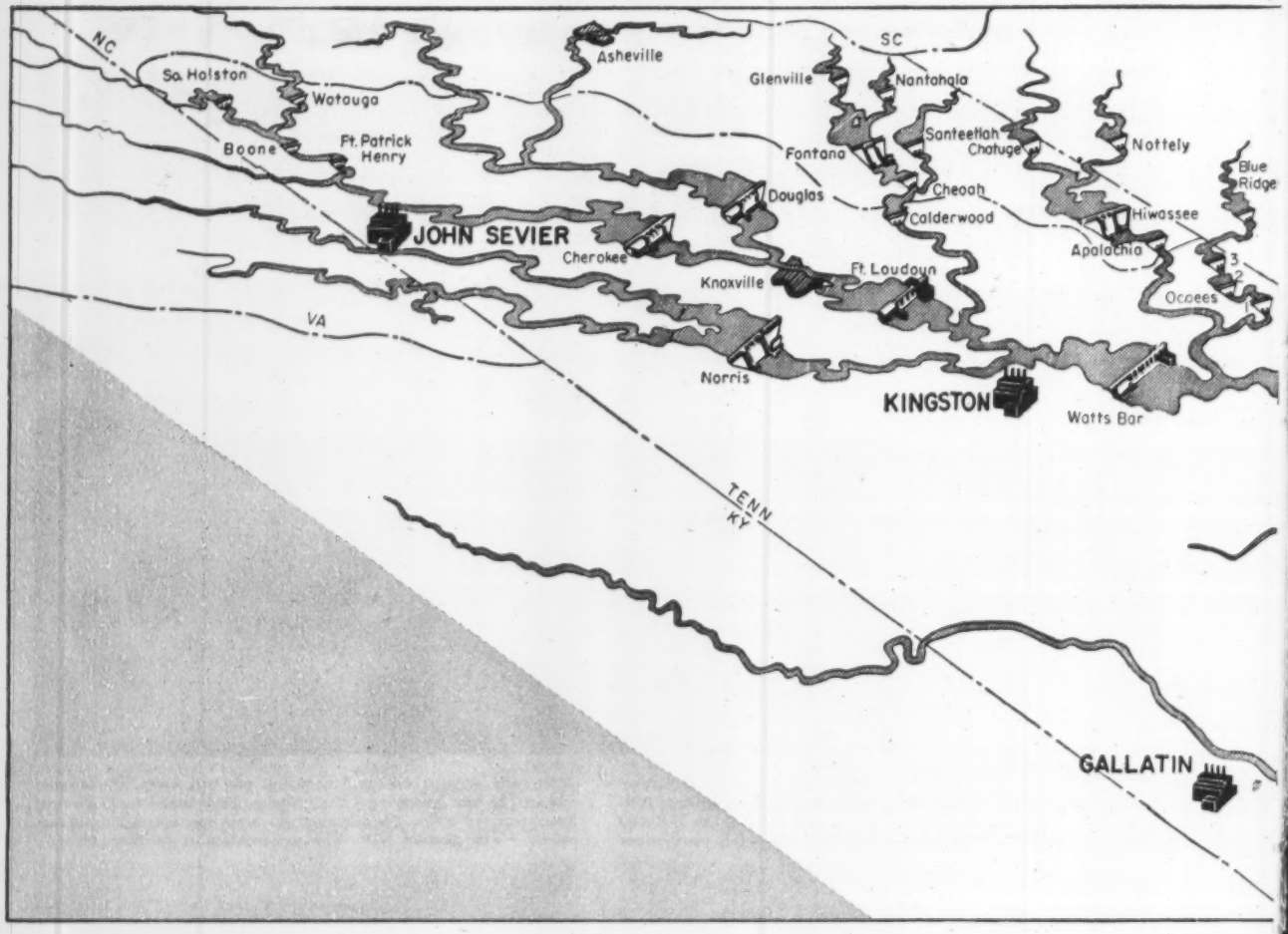
Look out below! — Relocating 4.2 miles of County Road 360 at Lookout Point Dam, Oregon, G. D. Dennis & Sons, Portland, used 3 D Tournapull rear-dumps to haul 265,000 yds (530,000 tons) of rocky earth. Dump was made quickly and safely from ledges 27 ft wide. Moving 6½ to 7 bank yds per trip, each "D" delivers 104 to 112 tons hourly on 1300 ft cycles. Says Supt Donald Dennis, "Machines did a fine job widening shoulders and constructing access roads. We're pleased with their maneuverability in close places."

2 rigs, 300 yds per hr — Hauling wet clayey sand over 2200 ft cycles, these 2 C Tournapulls moved 28 loads per 50-minute hour. Haul speeds, despite very soft footing, averaged 8½ mph. Owner reports 300 mile drive to job took only 10 hours actual road time. Units belong to L-S-M Construction Co, Ltd, Swan River, Manitoba. Project shown is 250,000 yd, 7.1 mile widening of Hwy 14 near Foam Lake, Saskatchewan.

At Garrison Dam — In 2 months these 3 C Tournapulls built a 60,000 yd, 2.2 mile access road to the dam and reservoir. On 600 ft hauls, each unit moved 19 loads (190 pay yds) of sandy loam per 50-minute hour. Owners, Tennefos Constr Co, Fargo, N. D., report tires shown have lasted 10,000 hours. Since purchase in 1949, only 3 of original 12 tires have been replaced.

Tournapull—Trademark Reg. U.S. Pat. Off. Tournatractor—Trademark Pic-612-G

Refuse put to good use — Many contractors operate sanitary landfill dumps like this for communities that do not own modern earthmovers. Here, Tournatractor dozes garbage and refuse into a gully in Nashville, Tenn. Later, rig spreads earth cover that eliminates odors, other nuisances of open dump. When fill is completed, city will gain a park or building site. For more facts on these tools, write LeTourneau-Westinghouse Co, Peoria, Ill.



TVA dambuilders turn to steam

- **20 dams in 20 years—7 steam plants in 7 years**
- **River system's harnessed water now being boiled**

Arthur J. Fox, Jr.
Associate Editor

The men who built the model from which river development schemes the world around have been fashioned are now at work building steam power plants that may well serve as patterns until atomic power plants arrive.

Engineering and construction forces of the Tennessee Valley Authority, averaging about a dam a year since 1933, by 1950 had harnessed a river system, made it navigable for 630 miles and amassed over 3,000,000 kw of power—85% of it hydro.

These same forces—relying on earlier experience and developing new design and construction skills—are now approaching the peak of a $910.5-million steam power plant program that in seven years (ending with 1956) will have built seven different installations that total 6,500,000 kw in capability.

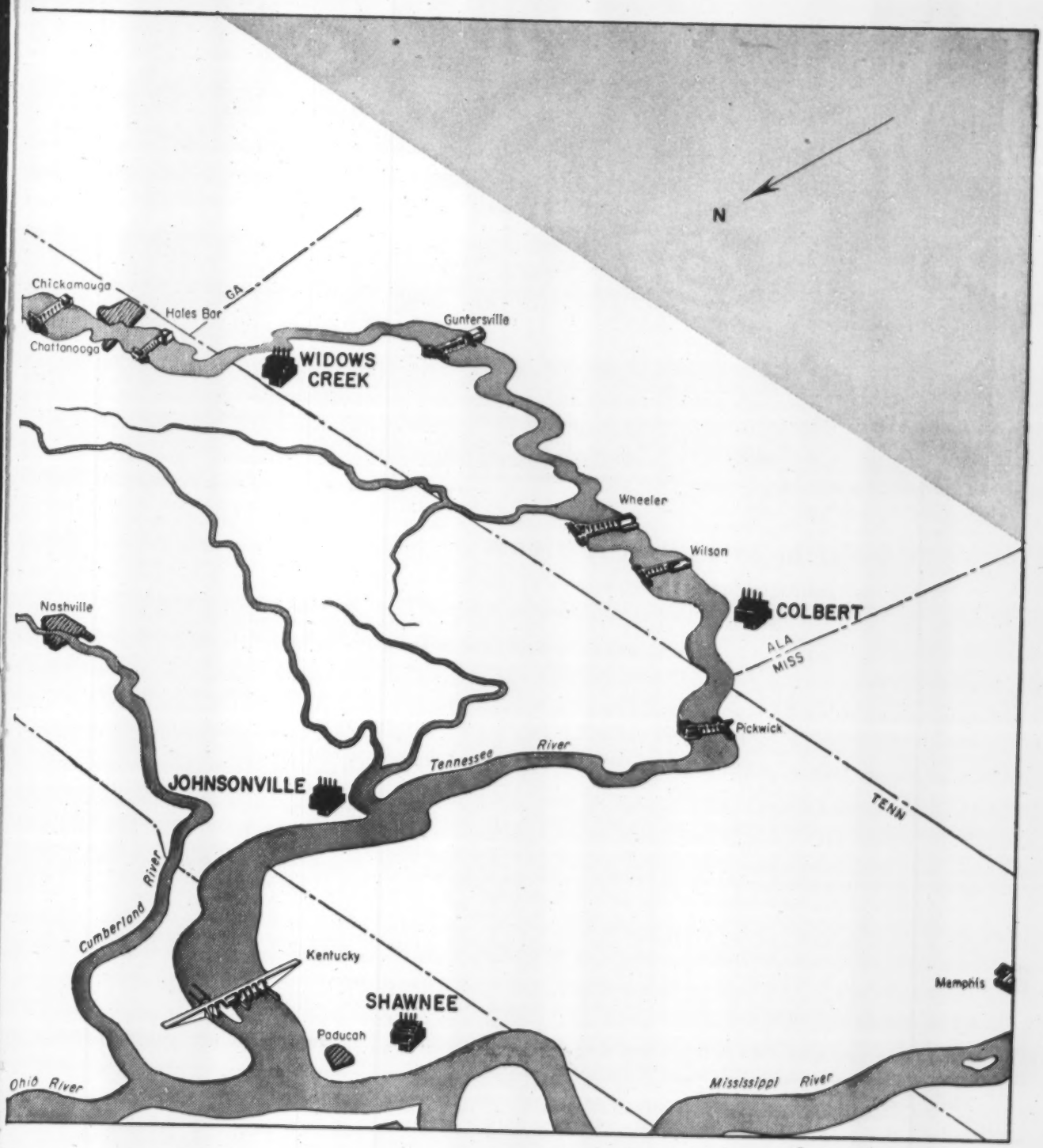
Plants now under construction will include the world's largest steam power station (Kingston, at 1,600,000-kw capability) and the largest single-shaft steam-electric units ever manufactured (two 250,000-kw capability turbine-generators for Gallatin).

Engineers, public administrators, agriculturists and sociologists from every continent long since have worn a path to Knoxville to see what TVA has wrought through river development. Today's visitor to the valley sees in addition to the fruits of river development a highly experienced team of engineers and constructors working on seven thermoelectric stations at almost every major stage.

Basically, the design and construction of these plants are enough alike to give the visitor to all seven a kind of moving picture of how a single plant grows. By the same token, they are different enough to give a picture of the great progress in steam station science since 1949 when TVA began its present $150 to $300-million-a-year program of construction. In these few brief years TVA-designed plants have gone from 1,000,000-lb-per-hour boilers at Johnsonville to 1,650,000 at Gallatin; from 1,450-psi steam pressures to 2,000; from 1,000 F steam temperatures to 1,050; from 1,800-rpm turbine speeds to 3,600; from 125,000-kw generator capabilities to 250,000. (See table for features.)

▶ The big switch to steam

How did TVA come to be currently one of the world's largest organizations for designing and constructing steam-power plants? How did an engineering organization marshaled in the



depth of depression to develop a river make the switch to steam? And why?

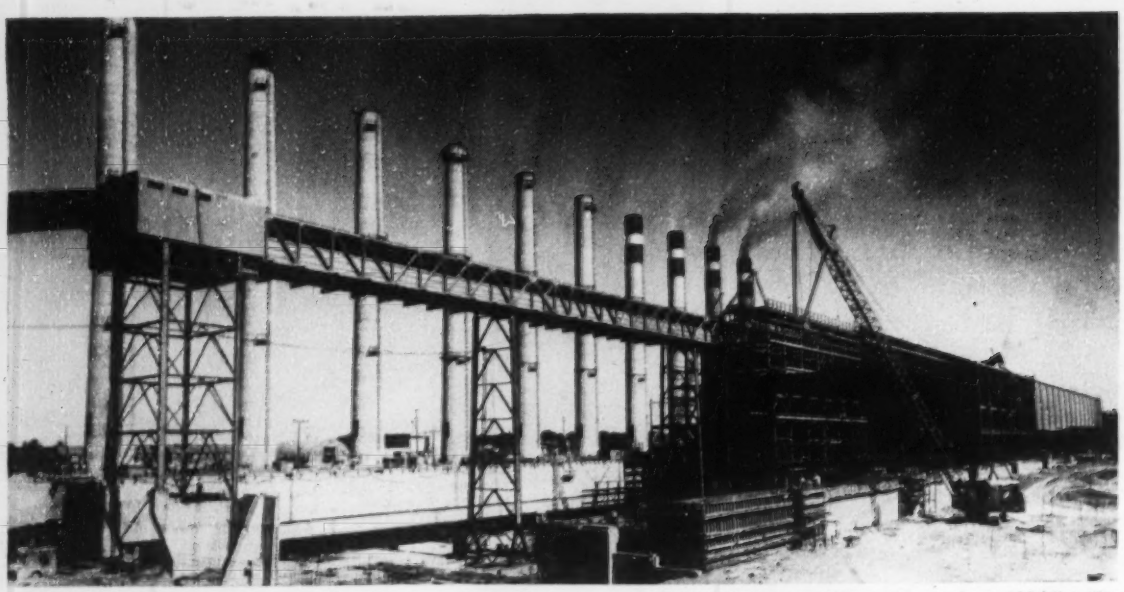
TVA was set up from the start to produce cheap power to be sold to municipalities and rural cooperatives for distribution. This it has done to the degree that in the area four times as many consumers have electricity today as compared with 1933; 90% of the farms are electrified as compared with 3.5% in 1933; residential consumers of power use about twice the national average—at half the nation's average unit price.

Most of this power came off shafts turned by the river.

• **First a purchase**—In 1939, with the purchase of $61 million worth of private utilities in its area, TVA had cut out for it the task of filling completely the valley's future power demand—by whatever means.

During World War II, with an even dozen projects going at once under pressure of power for aluminum and power for the hush-hush Manhattan Project at Oak Ridge, TVA undertook to build its first steam-power station

(*Continued on page 32*)



STRUCTURALLY these plants are big. Shawnee plant with its ten units of 150,000-kw capability will cost about $216.5 million.

. . . TVA dambuilders turn to steam

Plants they build are conventional, plus

—Watts Bar. Four 60,000-kw units were installed at a cost of $19.7 million, the first one coming on the line in March, 1942.

When need for Watts Bar steam plant came along, TVA was near its all-time peak engineer-construction force of over 27,000. But where was it to get the men to design and build steam plants when its force was hard at work in dambuilding? Some 1,800 of the authority's engineers were canvassed and 300 were found to have had some steam station experience in their pre-TVA days. From these came the core of field and office forces, around which is a design and construction organization was built. It was supplemented by the services of Boston consultant Charles T. Main, Inc.

• **Then needed construction**—In 1949, with more than 3,000,000 kw installed, TVA had above 85% of its capacity in hydro. Power demand was mounting 15% per year and damsites were running out. Steam power was inevitably in TVA's future. And TVA was anxious for it: Better balance of hydro and steam plus a shift of the system's center of gravity out of the East Tennessee mountains and closer to load centers were desired.

It was the Atomic Energy Commission, with demands for great quantities of power, that finally touched off the great current program of steam power plant construction—a program that has meant the growth of an 11,000-man team of engineers and constructors that is certainly equal to any in its field.

• **Amoeba-like growth**—First project of the present program was Johnsonville, on the Tennessee River due west of Nashville. Its engineering nucleus had Watts Bar experience behind it; and Charles T. Main was consulted on certain problems in initial stages. It was a big jump from the four 60,000's of Watts Bar to units of 125,000-kw capability at Johnsonville. Widows Creek, begun nearly a year later (March, 1950) on the Tennessee in northeast Alabama was Johnsonville's twin, with six 125,000-kw units.

From these two initial plants, trained TVA engineers have gone forth. The Johnsonville force moved in part to Shawnee, partly to John Sevier; Widows Creek sent a cadre to Kingston, a project manager to Gallatin; Colbert drew brains and brawn from both Johnsonville and Widows Creek.

"We're all kind of cousins down here," says one project manager with a smile, after trying to trace the movements of several individuals from job to job. He was joking about a sort of in-breeding that certainly appears to have worked well in building a family of capable thermo-plant engineers.

• **Development of skills**—This type of growth and development has prevailed from the engineering level right down through the labor ranks. To be sure, some specialists did come into the area. But by and large, TVA has enlisted and trained, right in the valley, a crack army of ironworkers, boilermakers, electrical workers, steamfitters, riggers, and carpenters.

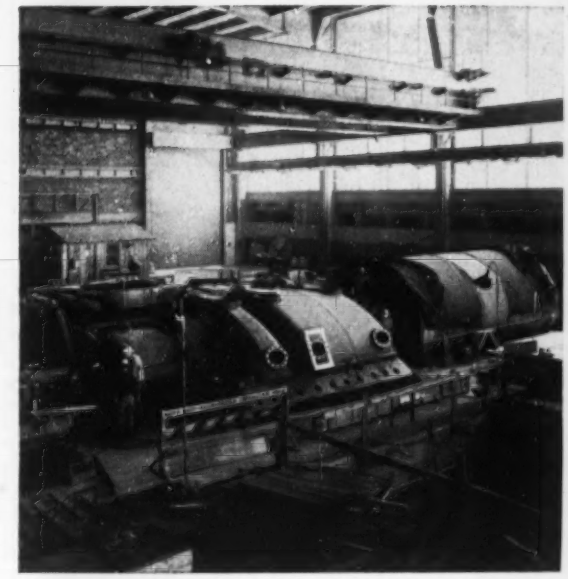
It should be recalled that TVA is an engineer-constructor, does most of its construction by force account. Thus, in effect, it is one of the world's largest general contractors. And as such, it subcontracts largely specialty work such as masonry, plaster, high pressure piping, metal siding, roofing, concrete stacks and heavy dredging.

It is basically a matter of economics. The authority tried its own precasting plant to make concrete channel sections for roofs; this venture proved that a contractor could supply them cheaper. Some waterfront work, erection of coal handling equipment, road building, and some steel erection have been let to contractors.

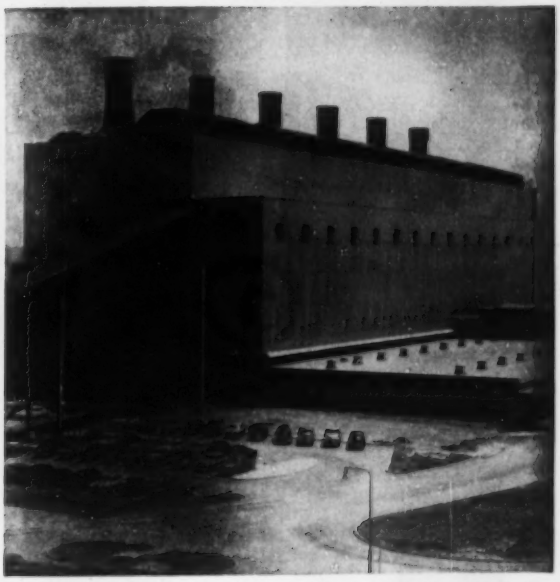
Equipment suppliers used to get installation contracts. But it proved economical (with 40 turbogenerator units authorized) for TVA to train

Here's what makes these

Name	Location	No. of units	Rated unit capacity kw
Colbert	On Pickwick Lake below Wilson Dam, Ala.	4	180,000
Gallatin	On Cumberland River near Gallatin, Tenn.	2	225,000
John Sevier	On Holston River near Rogersville, Tenn.	3	180,000
Johnsonville	On Kentucky Lake west of Waverly, Tenn.	6	112,500
Kingston	On Watts Bar Lake NE of of Kingston, Tenn.	9	4 @ 135,000 5 @ 180,000
Shawnee	On Ohio River 10 mi NW of Paducah, Ky.	10	135,000
Widows Creek	On Guntersville Lake SW of Bridgeport, Ala.	6	112,500



MECHANICALLY they are modern, with record-size units.



ARCHITECTURALLY they are smart. This is Johnsonville.

skilled erection crews. Now, TVA erects steel building frames, installs pumps and turbines, assembles generators and builds its own boilers—with the assistance of specialized erection engineers representing manufacturers.

Amassing a construction labor force and developing its skill and productivity apparently has been no great problem for TVA, working within its own bailiwick. The sole venture outside its power service area (to build Shawnee to supply power for AEC west of Paducah, Ky.) gave TVA a siege of labor troubles, although mild by comparison with that experienced by AEC at Paducah and Electric Energy, Inc., at Joppa, Ill. (See "Paducah: Labor lessons for an industry" in ENR Nov 19, 1953, p 21.)

In contrast to the Paducah area, TVA at its Colbert plant near Muscle Shoals, Ala., has drawn from the Tri-City Area (Florence-Sheffield-Tuscumbia) practically all the construction labor it has needed so far. Even when the force reaches its peak of about 2,500, there will be no dormitories required for imported labor—so well has a steady program of construction work stabilized the work force in the general area.

▶ The big steam stations

TVA engineers call their new steam plants conventional, and generally speaking, they are. But each has features of very special interest to identify it. In order of construction starts:

• Johnsonville has reinforced concrete cells anchoring it to its permeable rock foundation, as a cheaper resistance to uplift than added mat thickness (ENR Aug 10, 1950, p 40).

• Widows Creek has as its coal unloading work-horse the hammerhead crane (reconditioned) that built 480-ft Fontana Dam, TVA's tallest, during World War II.

• Shawnee, only plant of the seven not founded on rock, is in an earthquake area and thus has some extra bracing in its steel frame. Built on the Ohio River's flood plain, it is surrounded by 8-in. dia relief wells at 40-ft centers from which flood-stage groundwater will be pumped to lessen uplift.

• Kingston, holder of the new world's record for capability, will have an interesting skimmer intake (as will Gallatin) to draw coolest possible cooling water off the bottom of Emory embayment on Watts Bar Reservoir (ENR Dec 17, 1953, p 31).

• Colbert is the first (followed by John Sevier and Gallatin) to use 8-ft finished diameter concrete-lined rock tunnels for both intake and discharge of condenser water.

• John Sevier goes to one stack per pair of furnaces (as does Gallatin) and is interesting for its 25-ft high step-spillway concrete dam across the Holston River, there to store cooling

(Continued on page 34)

steam plants big . . .

Total rated capacity kw	Unit capability kw	Total capability kw	Steam pressure-throttle psi	Steam temp-throttle °F	Speed rpm	Generator voltage kv	Boiler[a] capacity/unit—lb steam/hr	Approx. coal consumption/unit—tons/hr	Condenser cooling water/unit gpm	Construction started	First unit on line—actual or scheduled	Last unit on line—actual or scheduled	Cost—actual or estimated
720,000	200,000	800,000	1800	1050	3600	20.0	1,280,000[b]	76	142,500	10-15-51	10- -54	5- -55	$110,500,000
450,000	250,000	500,000	2000	1050	3600	24.0	1,650,000[b]	99.5	144,200	5-11-53	11- -55	1- -56	85,000,000
540,000	200,000	600,000	1800	1050	3600	20.0	1,280,000[b]	70	113,500	10-14-52	6- -55	3- -56	96,000,000
675,000	125,000	750,000	1450	1000 3600	4 @ 1800 2 @ 3600	4 @ 13.8 2 @ 18.0	1,000,000	54	105,500	5-12-49	10-27-51	2-22-53	93,500,000
1,440,000	4 @ 150,000 5 @ 200,000	1,600,000	1800	4 @ 1000 5 @ 1050	3600	4 @ 18.0 5 @ 20.0	4 @ 1,000,000[b] 5 @ 1,280,000[b]	4 @ 58 5 @ 76.5	4 @ 90,000 5 @ 121,400	4-30-51	2- -54	11- -55	213,000,000
1,350,000	150,000	1,500,000	1800	1000	3600	18.0	1,000,000[b]	58	107,600	1- 6-51	4 - 9-53	5- -55	216,500,000
675,000	125,000	750,000	4 @ 1450 2 @ 1800	1000	3600	18.0	4 @ 1,000,000 2 @ 850,000[b]	4 @ 51 2 @ 49	4 @ 107,600 2 @ 92,500	3-28-50	7-1-52	7- -54	96,000,000

Notes: a. TVA-built plants have one boiler to each unit. b. Reheat type.

...TVA dambuilders: advance with the art

water for use over weekends when Ft. Patrick Henry hydro-plant upstream is discharging a restricted flow.

• Gallatin, with the world's record units (250,000 kw), will have boilers so large in the length dimension of the plant that there will be space in the turbine room to place turbine-generator units end-to-end instead of parallel, thus greatly cutting width of the room, span of its rigid frame structure, and length of its two 90-ton bridge cranes.

Some of these and other unusual features of the seven plants are dictated by evolutionary growth of unit sizes in mechanical and electrical equipment. Other innovations of design and construction have been devised by TVA engineers, architects and constructors for reasons of economy or appearance.

• **Mechanically modern**—TVA engineers have as their basic concept in design of steam plant mechanical equipment "to take advantage of all advances—to a point." For example, they have progressed from 125,000-kw to 250,000-kw units in easy stages. (150,000-200,000-250,000). The next jump, to 300,000-kw, they choose to leave for the present to someone else. While they may not go higher in unit size, Head Mechanical Design Engineer H. J. Petersen says TVA would prefer never to start another unit smaller than 250,000 kw, so great is the gain in operating economy at this largest size. The 250,000-kw units are not nearly so large in relation to installed capability of the system as were the 60,000-kw Watts Bar units when those were installed.

Mechanical design has also gone over completely to reheat boilers since the early units at Johnsonville and Widows Creek, which were not reheat.

As a measure of mechanical efficiency, TVA-built plants rate well in Btu's required per net kilowatt produced. Johnsonville plant is listed by the Federal Power Commission (Steam Electric Plant Construction Cost and Annual Production Expenses) as using 10,086 Btu per net kw. It is the eighth most efficient of 331 plants listed; some reheat stations beat it, as would be expected, but Johnsonville betters the heat rate of several reheat plants.

Only mechanical equipment to move outdoors in TVA design are the centrifugal fly-ash collectors, the induced draft fans and the stacks. At Johnsonville and Widows Creek this equipment is on the roof and stacks are steel. At all subsequent plants stacks are concrete and are on the ground alongside the powerhouse.

Stack heights have been an interesting development. They have grown progressively as a measure of prevention of damage by sulfur fumes. At Johnsonville the steel roof-stacks are to be raised 100 ft, from 170 to 270 ft above grade; at Widows Creek the last two units have higher stacks. Shawnee's concrete stacks are 250 ft; Kingston's are 250 and 300; Gallatin's will be 500 ft high—a single stack for the two record-size boilers.

• **Structurally conservative**—All this development in the art of making steam and putting it to work has had relatively minor effect on structural design. The growth in capacity has been accompanied by improved rates of heat exchange and other improvements in efficiency, so physical growth has not been proportionate. That is, the 250,000-kw unit will not take twice the space nor impose twice the load of a 125,000-kw unit. (It will, however, mean a few 3,000-kip column loads around the boiler.)

One unusual structure will be the cooling water skimmer gate at Kingston and Gallatin.

At Kingston it will be prefabricated steel caissons founded on rock in 40 ft of water with precast and prestressed concrete logs spanning between them to form gates. During hot summer weather, water flowing under the skimmer wall toward the pumphouse is expected to be about 15 F cooler than it would be without this wall.

OUTDOOR EQUIPMENT is limited to stacks, fans and fly-ash collectors. Shawnee units are being fired up as finished.

At Gallatin the idea is the same, but construction will be accomplished in the dry there. Another interesting facet of the cooling water problem at Gallatin is the fact that its supply depends on completion of the Corps of Engineers' Old Hickory Dam, downstream 25 miles on the Cumberland River.

• **Construction is heavy**—Earthmoving, roadbuilding and rail laying are major elements of construction on these plants. There is an immense amount of grading required on the large sites (600 acres at Johnsonville; 1,900 acres at Gallatin) to accommodate the plant, coal handling and storage, and ash disposal. Kingston, for example, eventually will have 1,350,000 tons of coal on 58 acres of land. With its nine units gobbling 14,740 tons per day, that's a 90-day supply.

TVA's Construction and Maintenance Branch is its heavy construction arm. It moves onto a site almost as a subcontractor, does the rough grading (5,000,000 cu yd at Kingston), starts excavating, builds construction roads (laid out to become eventual service roads) and builds up railroad bed. By the time the total Engineering and Construction Division gets on the job in force, as a general contractor would, the C & M Branch may have its work wrapped up and be ready to move on to the next site. C & M construction plant is loaded on barges for cheap and easy movement by river up and down the valley.

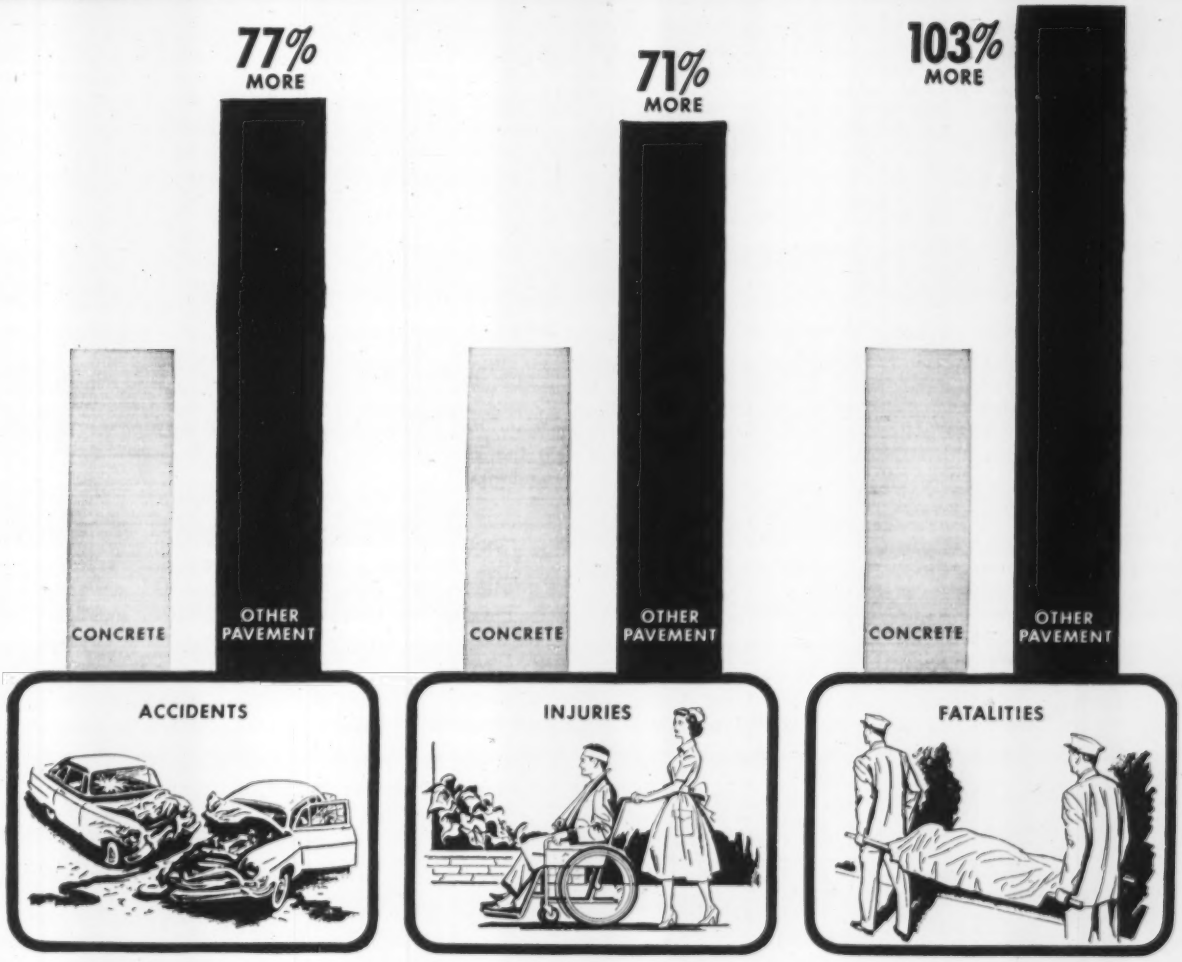
• **Architecture is smart**—These steam stations are good looking buildings, the products of TVA's architects.

Steel frames generally are clad in aluminum for low maintenance cost, with a sandwich of glass wool and steel panels behind it. Shawnee and Kingston are getting a maroon corrugated asbestos-protected metal; aluminum was a critical item when these plants were ready for siding.

Brick work around lower stories of the early plants was set back to expose faces of structural steel columns and spandrel beams. This was an architectural design intended to make the structure's framing visible. Cost of painting the exposed steel has been a factor in putting this effect out of vogue. Masonry now covers the steel.

TVA architects take very seriously the fact that these public power plants belong to the taxpayer. They are influenced by the not mutually exclusive desires to save the taxpayer's dollar, yet give him something of which he can be proud.

Facilities for public reception thus become a direct function of the architectural division. Parking space, a re-



3 billion-mile accident study again proves *CONCRETE* is safer

An analysis of highway accident records of the Washington State Patrol for 1952 once again proves that concrete is the safest pavement.

Washington's rural primary and secondary system has 1120 miles of concrete and 4427 miles of the other pavement most commonly built. In 1952 the concrete on the system handled more than 50% of the total vehicle mileage.

Average daily traffic per mile was four times greater on concrete. Concrete attracts traffic.

Despite greater traffic density (hence greater chance of accident) on concrete it was far safer. For equal traffic there were about 77% more accidents, 71% more injuries and 103% more deaths on the other pavement than on concrete.

In daylight there were 50% more accidents on the other pavement. *At night there were 63% more!* Concrete reflects light; dark pavement absorbs it. *If you can't see you can't be safe!*

When dry, there were 43% more accidents on the other pavement. *When the pavement was wet there were 68% more!* Concrete's gritty texture has uniformly high skid resistance, wet or dry.

For information on designing and building safe concrete roads write for free literature, distributed only in the United States and Canada.

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A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

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...TVA dambuilders: what's their future?

ception room, guides, toilets, observation routes, windows and balconies are all there for John Q. Public. And they are provided in a way that causes no interference with plant operation.

Johnsonville, on Kentucky Lake, has a very attractive observation deck on its administration wing. This minor cost item (measured against nearly $100-million worth of plant) is justified in the minds of TVA architects. And odds are that when John Q. reads the aluminum letters on the reception room wall that say "Built for the people of the United States", he, too, will be convinced that the deck overlooking scenic Kentucky Lake was a finishing touch worth its cost.

• **Costwise, reasonable**—Costs of all seven plants are given in the preceding table. More indicative are costs per installed kilowatt of capability. These range, so far, from $127 per kw at Johnsonville to $144 per kw including switch-yard at Shawnee; average for the seven plants, using estimates for future work, is $140 per kw. This figure is favorable by comparison with known costs of conventional indoor coal-burning plants. (See ENR Oct. 8, 1953, p. 151.)

Reasons for the Shawnee price of $144 per kw are location and schedule. It is in the Paducah area of labor strife referred to above, and on a site demanding more costly foundations and longer intake and discharge canals.

It is noteworthy that the Electric Energy, Inc., plant across the river at Joppa—a totally outdoor plant—is reportedly costing $184 to $188 per kw. Whatever hopes EEI and the private utility industry had of showing public power proponents how private enterprise can build bigger, better power plants more cheaply went up the flue at Joppa—mostly because of the labor situation.

▶ The big TVA question

In any attempt to foretell the future of TVA, it is impossible to ignore the political and social aspects. TVA today is a national issue (and it will be one as long as Congress holds the purse strings). The things it was created to do, it has done. What it is doing today—building a steam power plant a year—is the point at issue: private power versus public power, with all its ideological and economic implications.

• **Aside from the politics**—Politics may prevail, but these basic facts will endure:

There is in the Tennessee Valley an engineering force as big and as seasoned as an army division. It is a "can-do" outfit.

It was there when the U. S. needed aluminum in World War II. It was there when Oak Ridge needed power; when Paducah needed power.

And now, it is there as the agency AEC recently tagged for a one-year study of commercial nuclear power.

TVA could conceivably become the designer-builder of the world's first commercial plant to produce power from the atom.

It may survive solely on the 15% per year rate of power demand growth that has persisted in the area.

Or, it may be made somehow to go out of business completely as a builder of further public power facilities.

Whatever happens, the wonders TVA has wrought and the engineering skill and experience it has accumulated will remain national assets.

• **Key men involved**—C. E. Blee is chief engineer of the Tennessee Valley Authority. Harry Wiersema is assistant to the chief engineer. James S. Bowman is chief planning engineer.

Robert A. Monroe is chief design engineer; A. A. Meyer is head of the civil design branch; George P. Palo, of structural and heavy equipment design; H. J. Petersen, of the mechanical design branch; Sven Kvaven, of electrical design; and H. B. Tour, head of the architectural design branch. Design forces now number almost 600 men, working a 45-hour week.

In the field, George K. Leonard heads the big decentralized construction organization. And key men on the present steam power projects are the project managers:

F. L. Weiss has Shawnee well along. Henry Lofft has the giant Kingston. A. H. Weber is winding up Widows Creek and starting the Gallatin job. Warren McMahan is project manager at Colbert; Hendon Johnson handled Johnsonville and now runs the John Sevier project.

Here's how TVA steam plant costs break down . . .

Plant	Johnsonville	Widows Creek	Shawnee	Kingston	Colbert
Number of units	Six	Six	Ten	Nine	Four
Capability (kw)	750,000	750,000	1,500,000	1,600,000 4—150,000 5—200,000	[800,000
Costs estimated in thousands of dollars					
Land and land rights	$ 45	$ 115	$ 439	$ 1,379	$ 274
Structures and improvements	19,327	19,877	45,320	38,377	21,264
Boiler plant					
Coal handling and storage	5,925	6,002	10,310	10,178	7,288
Main boiler plant	28,497	31,687	76,514	78,212	35,261
Turbo-generator plant					
Condenser cooling water system	3,892	3,232	12,323	6,661	4,125
Main turbo-generator plant	25,014	23,992	44,143	49,316	24,972
Accessory electrical equipment	5,122	6,303	12,519	14,454	8,546
Misc. power plant equipment	1,387	1,310	1,835	2,108	1,427
Transmission plant	6,197	5,309	12,682	12,045	7,191
Communication equipment	94	173	415	271	152
Total	**$95,500**	**$98,000**	**$216,500**	**$213,000**	**$110,500**
Total cost per kilowatt	**$127**	**$131**	**$144**	**$133**	**$138**
Powerhouse Data					
Powerhouse bldg. area (sq ft)	151,252	140,814	277,861	284,382	125,888
Volumes (including substructure)*					
Service bay (cu ft)	1,345,166	895,751	1,408,593	1,483,880	1,443,795
Boiler room (cu ft)	9,454,166	9,252,988	17,379,948	18,725,456	9,310,356
Turbine room (cu ft)	5,556,720	4,877,600	10,198,140	10,301,450	6,141,188
Total (cu ft)	**16,356,052**	**15,026,339**	**28,986,681**	**30,510,786**	**16,895,339**
Cubic feet per kw					
Service bay (cu ft)	1.79	1.19	0.94	0.93	1.80
Boiler room (cu ft)	12.61	12.33	11.59	11.70	11.64
Turbine room (cu ft)	7.41	6.50	6.80	6.44	7.67
Total	**21.81**	**20.02**	**19.33**	**19.07**	**21.11**
Total cost powerhouse	**$14,667,000**	**$16,389,000**	**$39,202,000**	**$34,038,000**	**$16,944,000**
Cost per cubic foot	**$0.897**	**$1.09**	**$1.35**	**$1.12**	**$1.00**
Cost per kw	**$19.56**	**$21.85**	**$26.13**	**$21.27**	**$21.18**

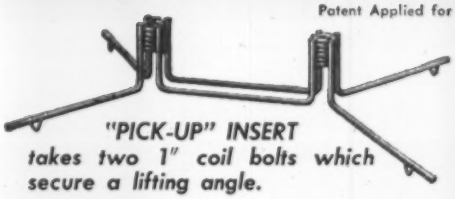
* Within outside of walls, basement floor and top of roof

The above table is an updating of TVA steam plant costs first published in ENR's 1952 Construction Costs Issue (Sept. 4, 1952, p. 163). Additional data tabulated here are area and volume figures, presented for ready comparison of costs on either of these bases.

From these figures it is also possible to develop the area of building per kilowatt of capability, volume of building per pound of steam capacity (see preceding table for boiler dimensions), or any other dimensional ratio desirable for comparing shape, size or cost of stations.

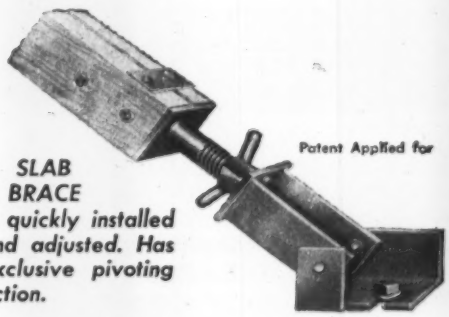
3 SUPERIOR ACCESSORIES FOR more efficient handling of "TILT-UP" SLABS

Patent Applied for



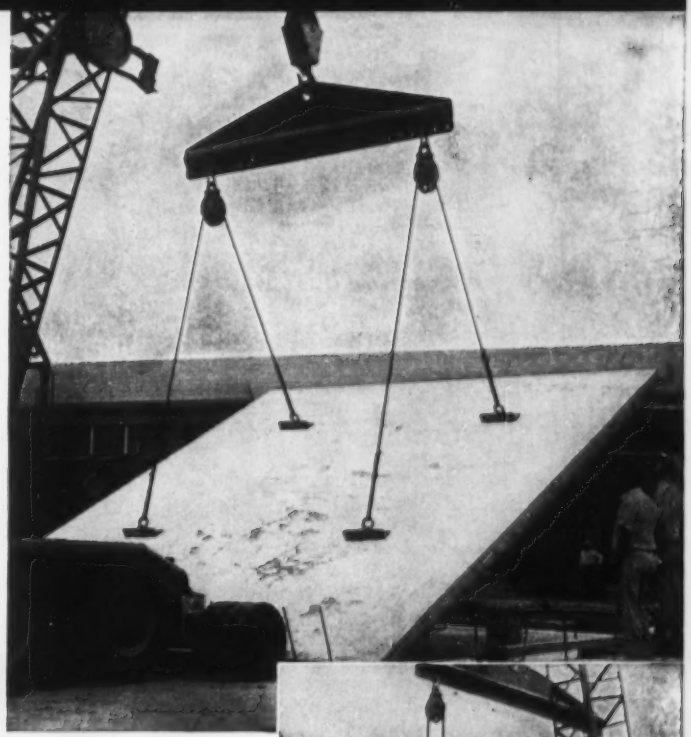
"PICK-UP" INSERT takes two 1" coil bolts which secure a lifting angle.

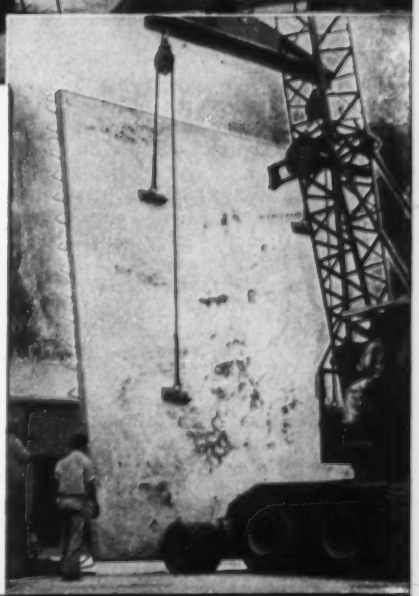
"ANCHOR" INSERT in both the "Tilt-Up" slab and the floor slab provides anchorage for slab brace bolts.



Patent Applied for

SLAB BRACE is quickly installed and adjusted. Has exclusive pivoting action.





Are you bidding on a "Tilt-Up Slab" job? Are you starting a "Tilt-Up Slab" Job? Then you will be interested in these SUPERIOR accessories, designed for faster and more efficient handling of precast panels.

The Superior *"Pick-Up" Insert* provides dependable anchorage for bolts which secure a lifting angle to which slings are attached when the panel is raised. *"Anchor" Inserts* in both the "Tilt-Up" slab and the floor slab secure the temporary bolts to which the braces are attached. With Superior's adjustable and pivoting *Brace* you have an efficient as well as inexpensive answer to both ordinary and unusual bracing problems . . . you merely assemble with 2 x 4's of lengths to fit individual jobs.

Wherever slabs are being "tilted-up" . . . on the Pacific Coast . . . in the Midwest . . . the South, and in the East . . . contractors are consistently using Superior Inserts, Anchors and Braces. For details request a copy of Bulletin TU-2.

SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office
1775 Broadway, New York 19, N. Y.

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2100 Williams St., San Leandro, Calif.

TRUSS ROOFED FACTORY was erected at a half-acre a day pace with high strength bolts and good organization.

TRUSSES GO TOGETHER in the field more easily than if they were riveted.

Bolts speed factory erection

Steel erection for a California factory building is progressing at a half-acre a day rate—thanks in part to use of high-strength bolts in structural field connections for the 2,600 trusses involved.

The job is a $40-million assembly plant for Ford Motor Co. at Milpitas, Calif., 45 miles southeast of San Francisco. It's a rush job: The owner wants to use the 1,710x790-ft, one-story building for auto assembly work by August. And, there is a lot to be done after steel erection is finished.

The steel contract, awarded on competitive bidding direct to Bethlehem Pacific Coast Steel Corp., permitted the fabricator to choose between rivets and high-strength bolts for field connections. Bethlehem figured that bolts would make the field work faster and cheaper.

One reason for bolting is that experienced riveting crews are in short supply in the area for field work, and training such crews takes time. On the other hand, an organization having the know-how can train a competent structural iron worker so that an efficient job of turning up high-strength bolts can be done. Such training need take about only an hour or so.

Another reason is that a two-man bolting crew can accomplish the same work that would be done by a four-man riveting crew (heater, sticker, bucker-up and driver)—with less equipment. Riveting also necessitates more scaffolding for adequate safety.

• **Calibrating wrenches** – Bethlehem Pacific initiated development of a method of calibrating impact wrenches for field use that is fast and reasonably exact. The workman at the beginning of the day turns up a bolt of the proper size against a hydraulic jack. Tension in the bolt can be read directly from a gage attached to the jack. The valve controlling the air supply to his particular impacter can then be set for the wrench to stall at the desired tension. Stall is indicated by a heavier vibration in the wrench; the nut tightening socket will tend to recoil after each impact. This is a condition that workmen very easily learn to recognize.

After calibrating his wrench, the workman is checked by again tightening a test bolt but with the hydraulic jack gage concealed to see if the proper tension is reached. This check can be repeated simply and easily at any time the foreman or inspector considers that it might be necessary. Ordinarily such a calibration is good for an entire work shift—unless, of course, there is some change in the set-up such as different size bolts, a different compressor or more hose length.

The calibration device is highly portable and can be used for several different bolt sizes. The only other special equipment is an adequate air distribution manifold equipped with a pressure regulating valve and an air pressure gage for each torque wrench taking air from the manifold.

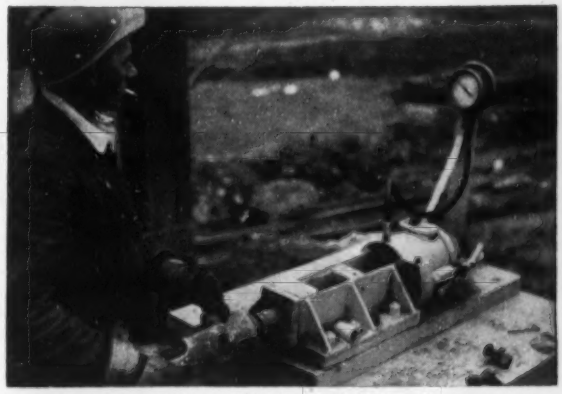
• **Cautions**—This system produces excellent results but there are several needed precautions. One is that the wrenches must be calibrated using the same length of hose between the wrench and the regulating valve that the operator will work with. And the air receiver delivering air to the wrench should not be more than 200 ft away from the tools using the air. Obviously, an adequate air supply must be maintained at all times. This means that both the pressure maintained and the capacity of the compressor must be adequate. That is, the compressor size is determined by the number and capacity of wrenches to be serviced.

Key to the whole procedure is the tension to which the wrenches are calibrated. High strength bolts are required to be torqued to 90% of their elastic proof load (This is the bolt tension just below the elastic limit where the permanent set will not exceed 0.0005 in.). But experiments have revealed that even under nearly identical conditions tension resulting from torquing will vary some 15%. So to guarantee that all bolts are torqued to 90% of the elastic proof load, the wrenches are calibrated to a somewhat higher set of values.

For example, according to ASTM Specification A-325 the elastic proof load of a ¾-in. bolt is 28,390 lb. Ninety percent of this is 25,560 lb. But in the calibrating procedure worked out by Bethlehem, the wrenches are set at a tension of 27,600 lb for ¾-in. bolts. Calibrating tension for ⅞-in. bolts is 35,000 lb and for 1-in. bolts is 46,000 lb.

• **Erection procedure**—Actual erection of the factory building is not too complicated. But it requires a high degree of coordination of shopwork, steel delivery to the job and field crews.

The building has a total of 38 bays



WRENCHES ARE CALIBRATED (left) by adjusting air flow so the impactor will stall when a predetermined tension in a test bolt is reached. Gage is obscured for checking during test impact (right).

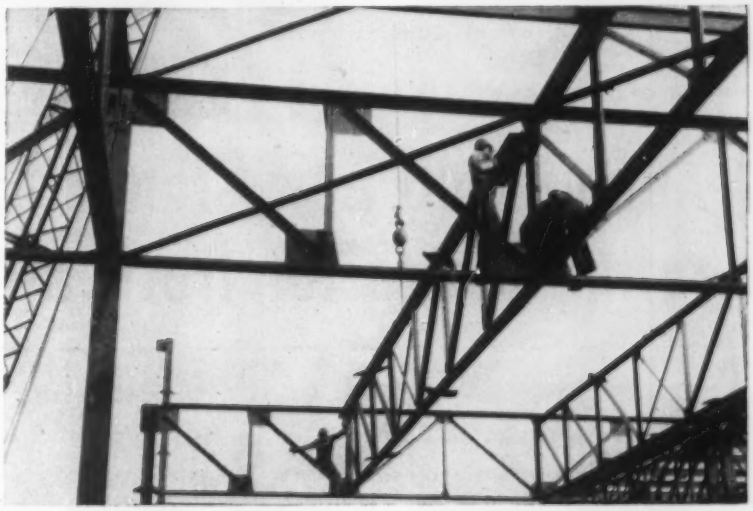
each 45 ft wide in the long dimension. In the short dimension, there are 14 bays, each 50 ft wide and a 90-ft spur track bay. Simplest erection procedure would have been to erect a pair of 50-ft bays for the entire 1710-ft length of the building and repeat the procedure for subsequent pairs of 50-ft bays until the structure is completed. However, the owner wanted to undertake wall, floor and roof installations closely following steel erection. Thus the requirement was made that the steelwork should proceed from the south end to the north end. Actual erection procedure is a compromise whereby a pair of 50-ft bays is erected for ¼ the building length or up to an expansion joint requiring double columns.

Work is undertaken in installments each of which is generally two 50-ft bays wide and four 45-ft bays long. From 32 to 38 trusses 45 and 50-ft long are included in each installment. All of these trusses are fabricated complete in Bethlehem's Alameda shop with shop work riveted. Exceptions are the 90-ft spur-track-bay trusses that are fabricated in two sections. And one or two of the small auxiliary buildings are fabricated at Bethlehem's Los Angeles works.

There are three steel erecting crews. Two crews, each equipped with a crawler crane, perform erection work on the main building. The third crew, equipped with a truck crane, erects auxiliary buildings and also fills in on the main building. A truck-crane equipped fourth crew unloads material from trucks as it arrives from the fabricating shop spotting the material by installments close to the point of ultimate use.

Following each erection crew is a crew that plumbs the structure, and a two-man bolting crew.

Columns are set on footings properly prepared by the general contractor on the job. These footings top drilled-in-place caissons. There are no base plates. The footings are brought up to grade with carefully leveled grout pads.



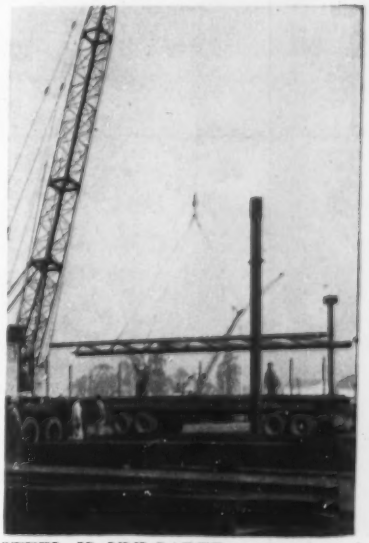
TRUSS ERECTION is speeded by complete shop fabrication of 45 and 50-ft trusses. Crane easily handles such units. One crane installs 15 to 20 such trusses a day.

Design is relatively simple. The 45x50-ft bays are encircled with main trusses on each side. And there are two secondary trusses at 15-ft centers along the 45-ft dimension. Purlins, girts and sag rods complete the steel work. Purlins and girts are attached with ordinary hand-wrench tightened machine bolts.

Roof is flat except for a ¼-in. slope in each 45-ft bay for drainage.

The building was designed by Albert Kahn Associates of Detroit. Grading work was performed by Cahill Brothers, Inc., and Swinerton & Walberg Co. General contractor working under a separate contract from the steel fabrication and erection work is J. H. Pomeroy & Co., Inc.

Steel erection is being accomplished by Bethlehem Pacific Coast Steel Corp., M. H. Frincke, manager of erection, and P. J. Skei, project superintendent.



STEEL IS UNLOADED near point of use by installments 2 bays wide and 4 bays long. Each installment includes 32 to 38 trusses.

3 CUBIC YARD MIXER
NATIONAL READY MIXED CONCRETE ASSOCIATION NRMCA
GUARANTEED BY MANUFACTURER TO MIX
3 1/2 CUBIC YARDS
AND CERTIFIED BY THE TRUCK MIXER MANUFACTURERS BUREAU TO COMPLY WITH ITS STANDARDS FOR TRUCK MIXERS AND AGITATORS AS APPROVED BY THE N R M C A
4 1/4 CUBIC YARD AGITATOR
UNLESS RATED LOWER ON THE MANUFACTURER'S DATA PLATE
N.R.M.C.A. REGISTRY NO.

New rating plate: Shows rated capacity and manufacturer's guaranteed capacity as truck mixer, and maximum capacity as agitator. Agitator rating is reduced when a lower rating is shown on manufacturer's data plate.

Announcing new standards and capacity rating plates for truck mixers, agitators

CAPACITIES IN CU. YDS. OF MIXED CONCRETE		
AS TRUCK MIXER		AS AGITATOR
Rated	Guaranteed	Maximum†
2½	3	3¼
3	3½	4¼
3½	4	5
4½	5	6¼
5½	6	7½
6½	7	9
7½*	8	10¼

*Sizes larger than 7½ cu. yds., in increments of 1 cu. yd. only, are standard when conforming to Bureau volume requirements.

†Unless a lower capacity is shown on manufacturer's data plate.

Complementing the new standards of the National Ready Mixed Concrete Association, the Truck Mixer Manufacturers Bureau has adopted revised standards for truck mixers and agitators.

These revised standards establish new mixer ratings of 2½ and 3½ cubic yards and further provide that all sizes of mixers be guaranteed by the manufacturer to mix an additional one-half cubic yard over their rated capacity. *Thus a standard mixer is now available to handle any size batch from 2½ cubic yards up, in ½ yard increments, as shown.*

The manufacturer's guarantee of ½ cubic yard additional mixing capacity provided in these Bureau standards, and the correlated requirement of 20 additional mixing revolutions in the new NRMCA standards, are based on many years of industry experience and extensive laboratory studies by both the NRMCA and individual mixer manufacturers.

These Bureau standards were approved by the National Ready Mixed Concrete Association on September 29, 1953 and became effective on that date. However, the 2½ and 3½ yard sizes become standard on May 1, 1954. New rating plates, showing both rated and guaranteed capacities, are now available from the Bureau for immediate attachment to all machines in the field which are now eligible to carry our rating plate, for sizes over 2½ cubic yards or greater. Owners are invited to make application for these plates.

The Bureau will gladly mail a composite copy of the new ASTM, NRMCA and Bureau standards, together with recommended practices for sampling and testing, to architects and engineers who wish to maintain these quality standards by incorporating them in their specifications. Address requests to TRUCK MIXER MANUFACTURERS BUREAU, 1325 E Street, N.W., Washington 4, D. C.

Member Companies

BLAW-KNOX EQUIPMENT DIVISION
Pittsburgh, Pa.
CHAIN BELT COMPANY
Milwaukee, Wis.
CHALLENGE MANUFACTURING CO.
Los Angeles, Calif.
CONCRETE TRANSPORT MIXER CO.
St. Louis, Mo.
CONSTRUCTION MACHINERY CO.
Waterloo, Iowa
IMPERIAL CONSTRUCTION EQUIPMENT CO.
Melrose Park, Ill.
THE JAEGER MACHINE COMPANY
Columbus, Ohio
THE T. L. SMITH COMPANY
Milwaukee, Wis.
WORTHINGTON CORPORATION
Plainfield, N. J.

Wire-winding machine prestresses beams

Precast concrete beams 50 ft long for a floor in the Sunrise Bank Building at Ft. Lauderdale, Fla., were prestressed by winding high-strength steel wires around them at full tension. The method eliminates costly bearing plates and end anchorages.

As in the method used for prestressing circular concrete tanks, a machine rolled back and forth along a precast beam, while the wire was fed from a 400-lb coil mounted on a rotating turntable on the machine through a die. Drawn to a diameter of 0.141 in., the wire was looped 92 times around the beam under a tension of 140,000 psi. The 1.75 miles of wire were anchored with an end fitting held by a flat bar wound under the wires. A coat of lightweight mortar then was placed pneumatically over the wires.

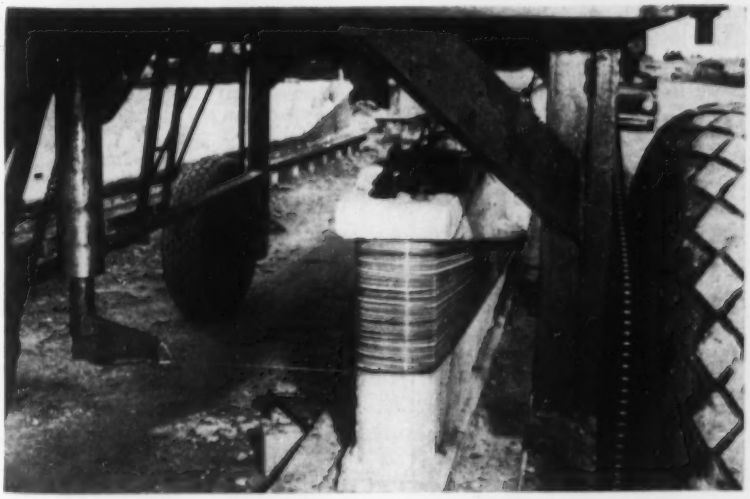
The building required five prestressed beams with clear span of 48 ft, three of which carry columns. A sixth beam was fabricated for test purposes.

The five members were designed as T-beams, but the top flange was not formed until they were erected. Then, with precast concrete joists set on top, the floor slab and flanges were cast simultaneously. Paper-backed wire mesh served both as forms and reinforcement for the slab.

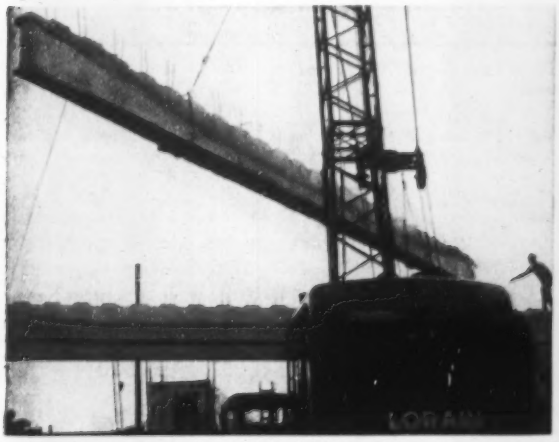
Gamble, Pownall and Gilroy, of Ft. Lauderdale, were the architects. Riley and Ross, of Miami, Fla., were the structural engineers, with D. E. Britt in charge of design.

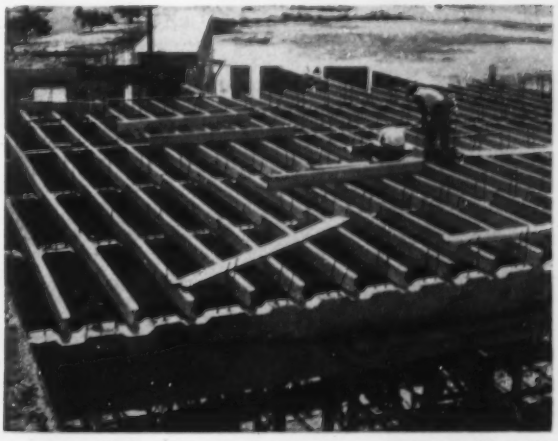
Richardson Construction Co., Ft. Lauderdale, was the general contractor. Maule Industries, Miami, fabricated the beams under license from the Crom Corp., Gainesville, Fla., which holds a patent on the wire-winding machine.

PRESTRESSING MACHINE shuttles back and forth along a precast concrete beam wrapping wire around it under 140,000-psi tension.



STRESSING POST applying the wire swings around beam ends to make the winding continuous.





ERECTED in a Ft. Lauderdale, Fla., building, the prestressed beams span 48 ft and support precast concrete joists. After the forms for top flanges of these T-beams were placed, the floor slab and flanges were cast.

WEATHER

THE 30-DAY FORECAST of the U. S. Weather Bureau for the period from mid-February to mid-March calls for temperatures to average below seasonal normals in most areas west of the Continental Divide but above normal east of the Divide except for near normal in the Southeast. Fairly large week-to-week variations in temperature about these averages are anticipated.

Precipitation is expected to exceed seasonal normals over most of the area from the Rockies to the Appalachians, providing relief from the dry spell which has prevailed. Subnormal amounts are predicted along the Atlantic seaboard and near normal west of the Great Divide.

Observed precipitation and temperature in 20 cities, compared with normals

City	Precipitation, inches: Jan. 1954	Departure fr. normal	1 mo. 1954	Departure fr. normal	Mean Jan. '54	Temperature, degrees: Departure fr. normal	Av. daily Maximum	Av. daily Minimum
Atlanta	3.73	−1.94	....	....	45.2	+0.6	55.4	34.9
Baltimore	2.02	−1.64	....	....	32.8	−1.4	42.3	23.3
Birmingham	6.35	+1.37	....	....	46.2	+1.0	57.5	34.8
Boston	3.26	−0.24	....	....	26.0	−3.1	33.4	18.5
Chicago	1.10	−0.74	....	....	27.7	+2.8	35.2	20.1
Cincinnati	2.34	−1.10	....	....	35.2	+2.1	42.9	27.4
Cleveland	3.12	+0.74	....	....	28.5	0.0	36.4	20.5
Dallas	3.03	+0.56	....	....	46.1	+0.4	56.7	35.5
Denver	0.15	−0.35	....	....	38.2	+6.8	50.5	25.9
Detroit	1.68	−0.40	....	....	26.1	−0.1	32.6	19.5
Kansas City	0.05	−1.38	....	....	29.3	−0.7	39.4	19.1
Los Angeles	4.60	+2.22	....	....	55.6	+0.6	64.1	47.0
Minneapolis	0.25	−0.55	....	....	10.3	−4.3	19.7	0.8
New Orleans	3.76	−1.02	....	....	56.8	+0.9	65.7	47.8
New York	1.77	−1.69	....	....	31.4	−1.5	39.0	23.7
Philadelphia	2.04	−1.35	....	....	33.3	−1.6	41.1	25.4
Pittsburgh	1.95	−0.88	....	....	33.0	0.0	40.9	25.1
St. Louis	3.11	−0.92	....	....	51.5	+1.4	56.3	46.7
San Francisco	1.51	−0.81	....	....	33.9	+0.6	43.1	24.6
Seattle	8.64	+4.15	....	....	39.1	−1.6	43.0	35.1

Precipitation range in 20 cities, in inches

Table shows range observed 33.3% of time. Rainfall heavier 33.3% of time, lighter 33.3% of time.
Computed by U. S. Weather Bureau (based on historical records of actual precipitation)

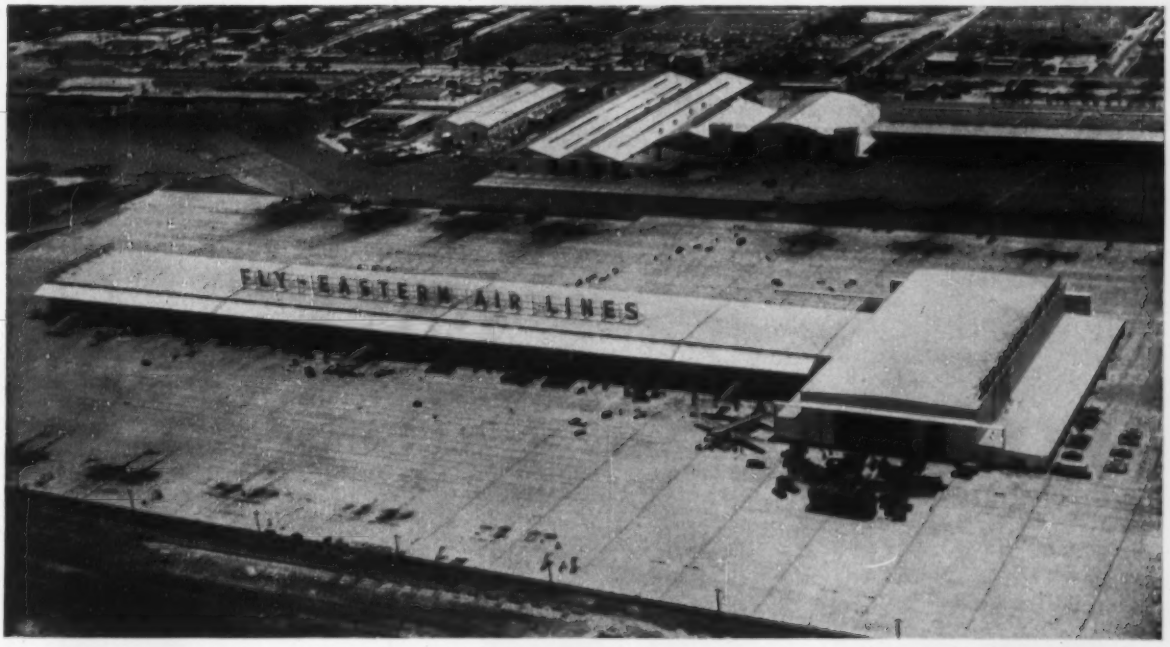
City	February	Mid. Feb.-Mid. Mar.	March	Mid. Mar.-Mid. Apr.	April	Mid. Apr.-Mid. May	May	Mid. May-Mid. June	June	Mid. June-Mid. July	July	Mid. July-Mid. Aug.	Aug.	Mid. Aug.-Mid. Sept.
Atlanta	3.36/5.67	3.40/6.00	3.43/6.33	3.12/5.72	2.82/5.10	2.48/4.72	2.14/4.33	2.50/4.38	2.87/4.43	2.93/4.62	2.99/4.80	2.89/4.90	2.79/5.00	2.24/4.30
Baltimore	2.36/3.39	2.48/3.76	2.59/4.13	2.50/4.17	2.58/4.20	2.76/4.30	2.94/4.40	2.73/4.42	2.52/4.44	2.57/4.71	2.61/4.98	2.91/5.32	3.20/5.66	2.65/4.51
Birmingham	3.47/5.88	4.18/6.26	4.48/6.63	3.91/5.85	2.94/5.07	3.05/4.81	3.16/4.55	2.90/4.70	2.64/4.84	3.29/5.18	3.94/5.53	3.44/5.39	2.92/5.25	2.32/4.47
Boston	2.64/3.93	2.79/4.22	2.94/4.50	2.66/4.45	2.39/4.40	2.58/4.29	2.76/4.18	2.42/3.84	2.09/3.50	2.35/3.76	2.61/4.02	2.60/4.36	2.59/4.70	2.32/4.20
Chicago	1.52/2.23	1.76/2.67	1.99/3.11	2.09/3.12	2.19/3.13	2.24/3.56	2.16/4.00	2.29/3.88	2.42/3.67	2.46/3.66	2.49/3.65	2.31/3.65	2.13/3.65	2.11/3.70
Cincinnati	1.80/3.00	2.10/3.64	2.39/4.29	2.66/3.94	2.34/3.80	2.42/3.85	2.49/4.10	2.59/4.30	2.69/4.50	2.54/4.10	2.39/3.70	2.32/3.95	2.24/4.20	2.02/3.64
Cleveland	1.51/2.43	1.81/2.71	2.10/2.98	2.15/3.13	2.30/3.27	2.27/3.38	2.33/3.49	2.17/3.53	2.00/3.56	2.24/3.82	2.47/4.08	2.15/3.84	1.83/3.60	2.07/3.51
Dallas	1.59/2.30	1.96/3.08	2.34/3.86	2.50/4.68	2.66/5.50	2.82/5.38	2.99/5.25	2.39/4.85	1.79/4.45	1.59/3.72	1.39/3.00	1.30/2.89	1.22/2.78	1.50/2.94
Denver	0.34/0.58	0.46/0.84	0.59/1.10	0.96/1.75	1.34/2.40	1.48/2.65	1.62/2.90	0.64/2.32	0.67/1.75	0.94/1.88	1.21/2.00	1.04/1.86	0.87/1.73	0.60/1.39
Detroit	1.51/2.50	2.14/2.64	1.77/2.78	1.78/2.76	1.79/2.73	2.14/3.20	2.49/3.67	2.66/3.88	2.84/4.10	2.48/3.90	2.09/3.70	1.94/3.54	1.79/3.38	1.80/3.41
Kansas City	0.99/1.90	1.29/2.40	1.59/2.90	1.99/3.15	2.39/3.40	2.82/4.40	3.24/5.40	3.42/5.82	3.61/6.25	3.19/5.47	2.77/4.69	2.74/4.84	2.70/5.00	2.84/5.00
Los Angeles	0.99/3.20	1.06/3.08	1.13/2.95	0.68/1.92	0.22/0.90	0.14/0.62	0.05/0.35	0.02/0.18	0.00/0.02	0.00/0.01	0.00/T	0.00/T	0.00/T	0.00/0.02
Minneapolis	0.52/1.08	0.75/1.38	0.98/1.67	1.34/2.14	1.69/2.60	2.16/3.29	2.64/3.98	2.89/4.49	3.14/5.00	2.64-4.50	2.14/4.00	2.16/3.85	2.19/3.70	2.24/3.78
New Orleans	2.79/4.70	3.00/5.00	3.22/5.30	2.94/5.15	2.66/5.00	2.65/5.12	2.64/5.25	3.18/5.88	3.72/6.50	4.54/6.95	5.37/7.40	4.90/7.08	4.44/6.75	3.78/6.12
New York	2.36/4.10	2.35/4.08	2.34/4.05	2.40/3.92	2.47/3.78	2.80/3.90	2.54/4.02	2.45/3.91	2.36/3.80	2.81/4.25	3.26/4.70	2.99/4.95	2.72/5.20	2.46/4.30
Philadelphia	2.57/3.68	2.60/3.84	2.62/4.00	2.56/3.91	2.49/3.82	2.44/4.11	2.39/4.40	2.54/4.25	2.69/4.10	2.94/4.24	3.19/4.37	2.99/4.91	2.79/5.45	2.44/4.62
Pittsburgh	1.77/2.83	2.06/3.15	2.34/3.47	2.32/3.44	2.29/3.40	2.39/3.58	2.49/3.75	2.68/3.98	2.86/4.20	2.79/4.35	2.72/4.50	2.52/4.15	2.32/3.80	2.20/3.30
St. Louis	1.57/2.90	1.92/3.42	2.27/3.95	2.43/3.88	2.59/4.10	2.86/4.65	3.13/5.20	2.96/5.25	2.79/5.30	2.60/4.78	2.41/4.25	2.28/4.18	2.14/4.11	2.12/3.84
San Francisco	1.99/4.71	1.96/4.13	1.94/3.55	1.30/2.54	0.67/1.54	0.44/1.12	0.18/0.69	0.09/0.37	0.00/0.05	0.00/0.03	0.00/0.01	0.00/0.00	0.00	0.00/0.13
Seattle	2.55/4.60	2.18/4.02	1.81/3.43	1.72/3.16	1.64/2.90	1.53/2.45	1.42/2.00	1.09/1.86	0.76/1.73	0.48/1.20	0.19/0.67	0.18/0.78	0.18/0.90	0.62/1.55

T—Traces (Less than 0.005 inches)

Mean temperature range in 20 cities, in degrees F.

Table shows range observed 25% of time. Mean temperature higher 37.5% of time, lower 37.5% of time.
Computed by U. S. Weather Bureau (based on historical records of actual temperature)

City	February	Mid. Feb.-Mid. Mar.	March	Mid. Mar.-Mid. Apr.	April	Mid. Apr.-Mid. May	May	Mid. May-Mid. June	June	Mid. June-Mid. July	July	Mid. July-Mid. Aug.	Aug.	Mid. Aug.-Mid. Sept.
Atlanta	45.1/ 47.9	47.5/50.1	51.2/53.6	55.9/58.0	60.9/62.6	64.9/66.5	69.0/70.5	73.5/74.6	77.3/78.1	78.5/79.3	79.0/79.9	78.9/79.9	78.0/79.1	76.3/78.1
Baltimore	34.6/38.0	38.1/41.7	42.0/45.7	46.6/49.4	51.9/53.6	57.5/59.0	63.4/64.6	68.2/69.5	72.5/73.8	75.2/76.6	76.2/77.5	75.5/77.3	73.6/75.7	71.1/73.3
Birmingham	46.0/49.4	48.8/5.17	52.4/54.7	56.6/58.5	61.1/62.6	64.6/66.3	68.4/70.2	72.4/74.5	76.8/78.1	78.4/79.7	78.9/80.0	79.0/80.3	78.5/79.8	76.6/78.5
Boston	27.8/30.0	31.4/34.0	35.6/38.6	41.1/43.3	46.7/48.3	51.5/53.1	56.7/58.4	56.8/58.6	66.3/68.1	69.6/71.1	71.7/73.0	72.1/73.4	70.9/72.1	67.6/69.2
Chicago	24.7/30.0	29.2/34.2	34.6/39.1	40.9/43.8	47.5/48.8	52.7/54.7	57.9/60.5	63.1/66.1	68.0/71.2	71.6/74.0	73.7/75.1	73.8/75.4	72.0/73.7	68.8/70.7
Cincinnati	31.6/36.0	35.2/39.2	39.6/43.1	45.4/48.1	51.4/53.3	56.4/58.6	61.5/64.0	66.7/68.9	71.2/73.0	73.4/75.2	74.1/75.8	73.9/75.7	72.5/74.4	70.2/72.1
Cleveland	26.2/29.7	29.8/33.7	34.7/38.8	40.3/43.2	46.2/47.8	51.8/53.9	57.9/60.3	63.5/65.7	68.2/70.2	71.2/73.0	72.7/74.2	72.5/74.2	70.9/72.7	68.5/70.6
Dallas	48.8/52.2	51.9/55.6	55.5/59.6	60.1/63.7	64.2/67.3	68.4/71.1	72.8/75.0	77.2/78.8	81.1/82.2	83.3/84.6	84.5/86.4	85.6/87.3	85.1/86.7	82.3/83.9
Denver	30.5/34.7	33.1/36.8	36.9/39.1	40.4/43.2	46.3/48.6	51.1/53.4	56.2/57.4	60.0/62.1	65.4/67.5	69.7/71.5	72.1/73.7	72.5/74.0	70.8/72.2	67.3/68.6
Detroit	24.6/28.9	27.9/32.1	33.1/37.2	39.3/42.1	45.6/47.1	51.0/52.8	56.5/58.7	62.3/64.4	67.3/69.4	70.6/72.1	72.5/73.5	72.3/73.6	70.5/72.0	67.5/69.5
Kansas City	32.2/37.1	37.2/41.2	42.9/45.9	48.6/51.3	54.9/56.7	59.9/61.7	64.6/66.4	69.4/71.2	74.2/76.0	78.0/79.6	80.0/81.5	80.2/81.8	78.4/80.1	74.6/76.6
Los Angeles	52.9/58.1	54.1/56.3	55.4/57.4	56.6/58.4	58.1/59.7	59.8/61.3	61.4/62.8	62.5/64.0	63.9/65.4	65.4/67.0	66.9/68.4	67.5/68.9	67.4/68.6	66.8/68.1
Minneapolis	15.0/20.8	21.7/25.9	29.9/32.5	37.3/40.3	44.7/47.9	51.3/54.4	57.2/60.2	62.2/64.9	66.6/69.1	70.3/72.5	72.9/74.9	73.2/75.0	70.8/72.3	66.3/68.4
New Orleans	55.9/59.3	57.6/60.8	60.6/63.0	63.4/65.7	67.4/69.1	70.7/72.1	73.8/74.9	77.0/78.1	79.9/80.9	81.0/81.9	81.4/82.3	81.8/82.7	81.8/82.7	80.8/81.9
New York	30.9/33.6	34.1/36.8	38.7/41.3	43.6/46.0	49.0/51.0	54.6/56.3	60.6/62.1	65.9/67.5	70.4/72.2	73.6/75.0	75.2/76.3	75.1/75.5	73.6/74.9	71.0/72.5
Philadelphia	32.3/35.3	36.4/39.2	40.8/43.5	45.6/47.9	50.8/52.6	56.2/58.0	62.3/64.0	67.5/69.2	71.5/73.1	74.1/75.4	75.5/76.6	75.1/76.3	73.3/74.5	70.6/72.1
Pittsburgh	26.9/32.0	30.8/35.4	36.0/40.6	43.3/46.5	48.0/49.8	53.1/55.1	58.7/60.9	63.5/65.8	67.4/69.7	70.2/72.0	71.4/72.8	71.0/72.4	69.3/70.9	67.2/68.9
St. Louis	33.7/38.1	37.8/41.8	42.9/46.3	48.6/51.5	54.5/57.0	58.4/61.9	64.0/66.6	68.7/71.5	73.5/76.2	76.9/79.0	78.7/80.2	78.5/80.1	76.7/78.5	73.6/75.6
San Francisco	50.0/51.7	51.0/52.8	51.7/53.5	52.4/54.2	53.2/55.0	54.3/55.9	55.9/57.4	57.5/59.1	58.8/60.5	59.6/61.0	59.7/60.9	59.5/60.7	60.1/61.2	60.9/62.2
Seattle	39.7/42.0	41.7/43.3	43.6/44.7	45.8/47.2	48.2/49.9	51.0/52.9	54.2/56.3	56.9/58.5	59.3/60.4	61.7/62.7	63.6/64.6	63.8/65.0	62.7/64.1	60.8/62.0



Aerial view of Eastern Air Lines' base at Miami International Airport. Maintenance building in foreground designed by Leslie B. Taylor, consulting structural engineer, of Miami. Construction supervised by J. Herbert Shartle, Eastern Air Lines engineer. Steelwork fabricated and erected by Bethlehem Steel Company.

World's Largest Maintenance Hangar

This mammoth building, dwarfing the planes on its concrete ramp, is Eastern Air Lines' new $5,000,000 maintenance hangar, largest and most modern of its kind in the world.

Built in the shape of a T, the three-story structure stretches nearly a quarter of a mile from end to end. The stem of the T provides fourteen work ports, seven on each side, while the huge hangar crossing the T accommodates two Super-Constellations. In addition, the 448,748 square feet of floor space contains maintenance offices, overhaul shops, stockrooms and a large, one-story warehouse.

The sturdy framework of this remarkable building consists of 3082 tons of structural steel, fabricated and erected by Bethlehem Steel Company. Erecting an average of almost 100 pieces of steel every day, Bethlehem completed the job in just 70 working days.

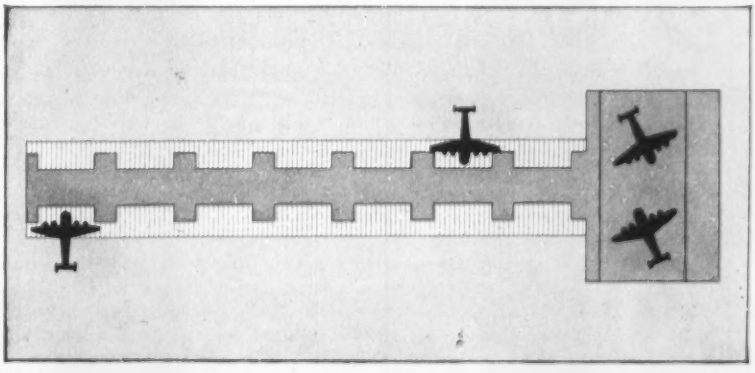
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

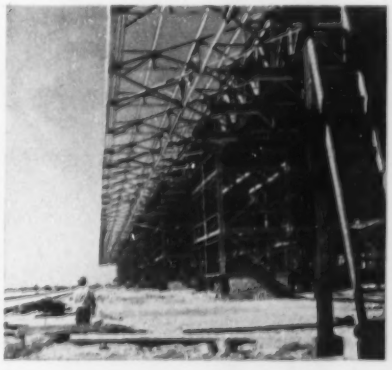
BETHLEHEM STEEL

BETHLEHEM STEEL

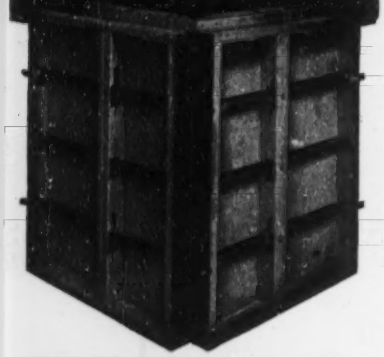
Plan view of ground floor. Thin lines indicate overhanging roof supported by cantilevered trusses.



View of steelwork for 1219-foot-long hangar.



SYMONS



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Commission presents plan to modify bridge program

To eliminate navigational problems presented by a proposed bridge across the Columbia River (paralleling a 36-year-old structure connecting Portland, Ore., and Vancouver, Wash.) the old bridge is to be altered at a cost of $1.4 million and plans for the new link are to be modified so that it will duplicate the altered structure.

The Oregon Highway Commission has issued an order to Chief Engineer R. H. Baldock to revise plans for the new bridge and draw up the necessary modifications for the existing bridge. The commission specified that changes are contingent on agreement by the federal government to pay for revising the plan of the old bridge. It was argued that this could be done under the Truman-Hobbs act, which provides for the federal government to pay the costs of modifications of existing bridges when the work is done as the result of an act of the federal government.

The existing bridge has a lift span at the northern end, over the deep river channel, while under present plans, the lift span of the new bridge would be farther south. Shipping interests and towboat and barge operators claim that if work were completed as planned it would be difficult to weave ships under the two structures.

Plans for remodeling the old bridge call for shifting the lift section a few spans to the south—to mid stream—and raising the center spans 30 ft. Foundation supports of most of the truss spans would have to be changed.

Changes in plans for the second bridge would boost its cost from $11 million to $11.5 million, but the federal government would not be asked to pay the difference.

Col. Thomas H. Lipscomb, Corps of Engineers district engineer at Portland, said that his office has not ruled

City switches to waterproof plywood signs

Claims of high satisfaction with traffic signs of resin overlaid fir plywood have been reported from R. E. Schmidt, traffic engineer of Tacoma, Wash. Schmidt says that the city has been replacing all its existing signs with the plywood type and that there are now 4,000 in place. About two-thirds of them are reflectorized.

Primary reason for enthusiasm is the thwarting of vandals. Five-eighths-in. panels for blanks, the edges sealed with a highly water-resistant formula developed by Paul Lemcke, of Tacoma, discourage attempts at wrapping them around posts. The medium-density resin overlay, he says, protects the sign faces so they do not chip when struck by rocks or bullets.

Since the replacement program began, monthly sign requirements have dropped rapidly, according to Schmidt.

This type of sign material currently is being used by the state of Oregon, and in the East. Connecticut produces 12,000 signs per year in its prison shops.

on the Oregon-Washington bridge application, which encountered strong opposition from shipping interests. He added that his office has discussed suggested changes with Baldock. Presumably the state agreed to alterations suggested informally by the corps after it appeared that navigation objections are substantial.

Filter plant setback will delay water program a year

The city council of Columbus, Ohio, has been told that its $20-million Hoover Dam project (ENR Aug 13, 1953, p50) will not furnish the city with needed supplementary water until 1956, a year later than its originally estimated completion date.

Service Director Floyd C. Redick explained that the reason for the delay is construction of the city's $3-million filtration plant that will treat Hoover reservoir water.

The dam itself, 40 days ahead of schedule at last reports, will be completed in April, 1955, if all goes well.

Redick told the council's service committee that he did not believe added cost for speeding work on the filtration plant would be worth it. He said that the reason for delay was indecision over what capacity to make the plant. Currently it is scheduled to be able to treat 48 mgd.

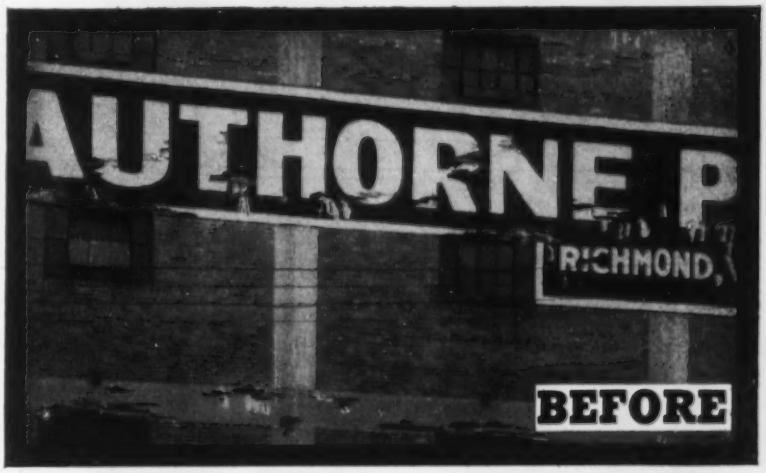
Municipal briefs . . .

• **Milwaukee**—The city of Milwaukee spent or committed a total of $24 million for capital improvements in 1953, with more than $29 million in cash appropriations and bond issues budgeted for projects this year.

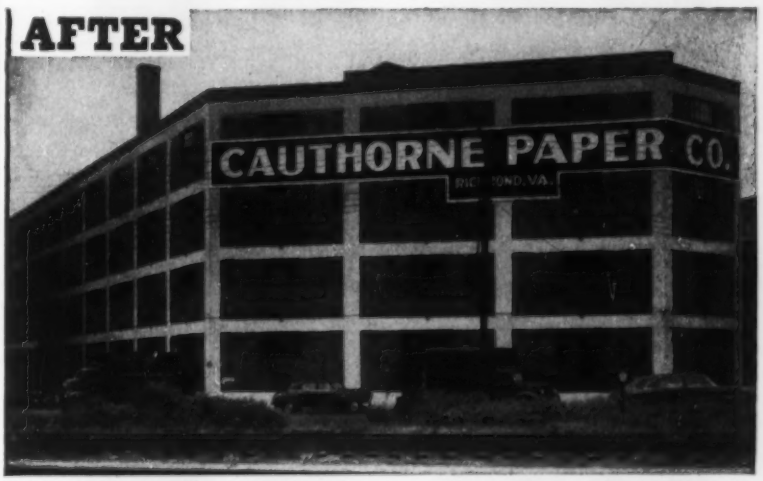
• **Bid for revenue**—A bill, sponsored by the Elizabeth, N. J., Parking Authority, now pending in the New Jersey Legislature would amend state law to grant municipal parking authorities control of all parking facilities within their boundaries and to receive meter revenues now collected by city governments.

• **Taking up the slack**—Home shortages in Jacksonville, Fla., will get some relief next year when families move into a 1,200-homesite project that will rise on a 350-acre tract on the outskirts of that city. The development, known as Brookview Homes, will boast an exhibition building and a clubhouse, built by the Men's Garden Club of North Florida, on an eight-acre plot in the project.

THORITE patching mortar and two THOROSEAL applications rejuvenated this Virginia building



Constant weather exposure over the years caused the masonry of this building to disintegrate. If this unsightly condition had not been corrected it would have finally imperiled the structure of the building.



All concrete spandrel beams, columns, window heads and brick sills were patched and brought flush with surrounding surface by the use of The THORO System product, THORITE, a twenty-minute set, nonshrink, patching mortar. Two brush coats of THOROSEAL were then applied over entire reinforced concrete surfaces, to prevent further disintegration, also to beautify building.

CONTRACTOR: Southern Waterproofing and Concrete Company, Inc., 1704 Arlington Road, Richmond, Virginia.

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RIO BLANCO BRIDGE, near Vera Cruz, Mexico, has wire rope hangers fastened to arches that are inclined to minimize the need for lateral bracing.

DIAGONAL GRID-BEAM FLOOR SYSTEM has welded dovetail joints.

Inclined-arch bridge spans 250 ft

Welded space-structure consists of a pair of tied arches supporting a diagonal grid-beam floor system

Thomas C. Kavanagh
Partner, Praeger-Kavanagh Engineers
New York

Camilo Piccone
Estructuras, S. de R. L.
Mexico, D. F.

Marking the successful introduction of a new arch form employing a minimum of overhead structure, a new welded steel tied-arch bridge spans 250 ft over the Rio Blanco near Vera Cruz, Mexico. The span carries three lanes of traffic and two sidewalks.

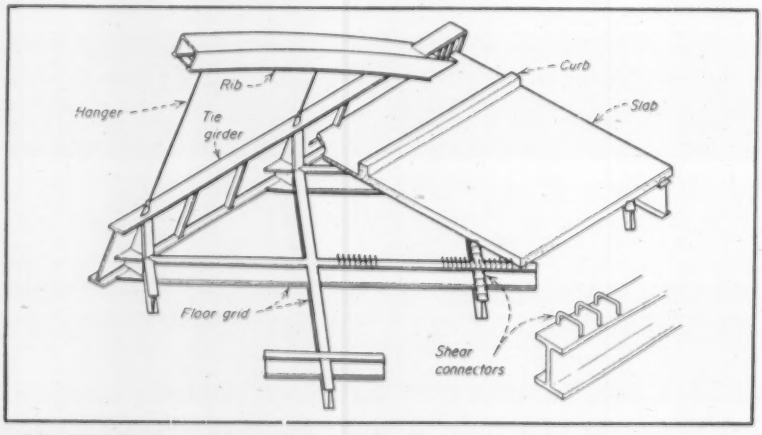
The superstructure consists of a pair of tied arches inclined toward each other, the ribs meeting over a length of 32 ft at the crown. The resulting "space structure" requires only four short top lateral braces for stability. The lower lateral system is provided by the roadway deck, a unique diagonal grid of welded beams. Working in combination with relatively heavy tie girders, which like the hangers, are inclined in the plane of the ribs, the deck imparts unusual rigidity to the structure.

The ribs are box-shape, open at the bottom, 24 x 26 in. in cross section. Batten plates at 3-ft intervals connect the lower edges.

A total of 15 wire rope hangers (1¾-in. suspension bridge strands) are provided in each inclined arch, panel spacing being 15 ft 7 in. Each hanger is connected to two stiffener plates on the arch rib. There are also two intermediate inside stiffening plates per panel length of rib. At the bottom, the hangers are attached to the tie girder by pairs of 8x½-in. straps passing through the upper flange and welded to the girder web.

The tie girder, which resists both tension and bending, has a 72x½-in. inclined web, but its 18-in. wide flange plates, varying in thickness from 1¼ to 1¾ in, are set horizontally.

• **Novel floor system**—The diagonal grid floor system was designed for composite action with the concrete floor slab through ½-in. dia stirrup-type shear connectors welded to the flanges of the beams. The system is an efficient means of carrying floor loads since the grid acts as a series of beams on elastic supports. Though highly indeterminate, the grid system can be analyzed without difficulty by iterative methods. Grid beams are fabricated shapes grooved by burning with a torch for dovetailing at junction points.



GRID SYSTEM'S panel points tie into stiffened and inclined tie girder at points where wire rope hangers connect. Arch rib is a welded box. Shear connectors for the floor slab are welded to grid beam flanges.

Advantages of this type of floor system include a general distribution of load concentration longitudinally, reduction of effects of concentrated loads, and reduction of live load moments in the beams. The rigidity of the floor system has been demonstrated by test loadings.

• **Bridge tested**—Erection of the bridge was carried out with timber falsework bents. Special precautions were taken in view of the unusual nature of the structure. A program of X-ray weld examination was set up in both field and shop. In order to obtain some stress relief in field welds, all field joints in ribs and tie girders were heated to approximately 1,100 F using a 2-in. gasoline torch and asbestos sheet covering.

After erection, the structure was tested by flooding the roadway with water to a depth equivalent to H-20 loading plus concentration on three lanes. Strain gages in the center hangers were read during the pumping of test water, and deflections of the tie girders measured at the same points. Results were about 80% of calculated figures, and are considered entirely satisfactory.

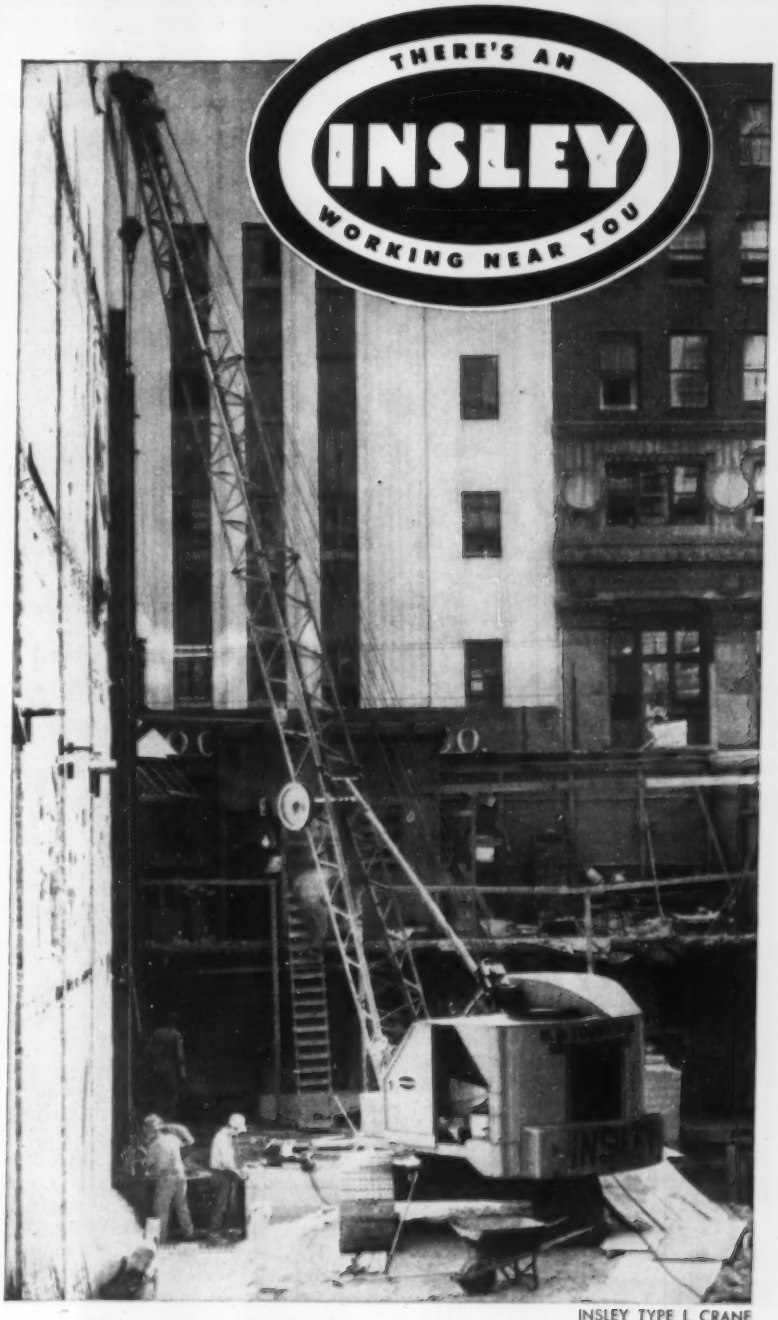
Additional tests have been run to verify the action of the bridge with regard to live loadings. In general, the floor has proved much stiffer than was expected, probably because of the composite action of the beam and slab.

• **Color added**—The unusual visual effect of the bridge has been heightened by painting the arch ribs orange and the tie girders cherry red.

Construction was started on Feb. 10, 1952, and completed on May 7, 1953. Camilo Piccone, co-author, designed the bridge, basing his plans on an original design by T. C. Kavanagh, co-author, who received for this scheme one of the major awards in the 1950 bridge design competition sponsored by the James F. Lincoln Arc Welding Foundation (ENR Nov. 16, 1950, p. 26).

Acknowledgments are made to the staff of the Papaloapan Commission, under whose direction the structure was built, to architect L. Gonzales Aparicio, and engineers Raul Sandoval, J. Ramos Magana, Gabriel Oropeza, J. M. Herrera.

Contractor for the whole job, including design fabrication and erection of the steel structure, was the firm of Estructuras, S. de R. L. Shop and field inspection of the welds was done by the Houston Gamma Ray Co.



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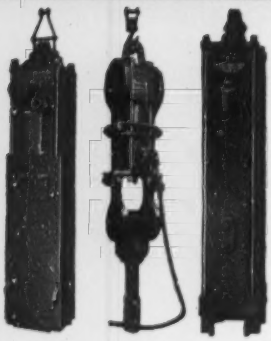

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MEN AND JOBS

Rudolph Christiani honored on firm's 50th annivesrary

Rudolph Christiani, head of the engineering and contracting organization of Christiani & Nielsen, was honor guest at a celebration of the 50th anniversary of that firm held recently in Copenhagen, Denmark. Representatives of many of the subsidiaries of the firm in 21 foreign countries had been brought to Copenhagen for the occasion.

Reinforced concrete, a relatively new construction material at the turn of the century, started Mr. Christiani on a career that was to send representatives of his firm to most corners of the world. In 1904, convinced that reinforced concrete, as then being developed by a French engineer named Hennebique, had great possibilities, Mr. Christiani, at the age of 27, formed a partnership with a 30-year-old naval officer, Aage Nielsen, to introduce that material to Denmark.

The firm first concentrated on small bridges and buildings, but four years later, when an opportunity came to develop designs and construction methods for wharfs in Hamburg, Germany, the partners set up a subsidiary there and developed a system of design and construction that started them on extensive operations in the field of harbor works and foundations.

Two years later a subsidiary firm was set up in Russia, and in subsequent years subsidiaries were established in a total of 25 countries, the latest having been Paraguay in 1951. An interesting aspect of this growth is the fact that all subsidiaries are organized as independent companies, under local laws and with their own officers. All engineering and construction activities, however, are controlled by the head office in Copenhagen, which also contracts with the subsidiaries for special work, such as design studies.

• **War headquarters in New York**—In 1940, due to war conditions in Europe, the direction of all activities of the firm outside of Axis countries was transferred to New York, under Henning O. Christiani, a son of the founder, as vice-president. The firm, however, never has undertaken to engage actively in engineering or construction work within the continental United States.

Following the close of hostilities in Europe, general control of the firm's activities was returned to Copenhagen, but the New York office was continued as a branch, chiefly to facilitate contacts with the subsidiaries in Central and South America.

Henning Christiani died in 1950. Paul Larsen now is head of the New York subsidiary. Aage Nielsen, one of the original partners, died in 1945. The present partners are Rudolph Christiani, the founder, and his son, Alexander. At 77, Rudolph Christiani still takes an active part in direction of the far-flung activities of the firm.

Careers • • •

• **A raise in rank**—Herbert D. Vogel—chief of the Southwestern division of the Corps of Engineers, with headquarters in Dallas, Tex.,—has been raised to the rank of brigadier general. He came to the Southwestern post in 1952 from the Panama Canal Zone, where he had served as lieutenant governor for three years.

• **French honor**—Nicholas Feodoroff, professor of hydraulics at Manhattan College, recently received the Medal of the French Renaissance—for scientific achievement—at the French Embassy in New York. He has been honored previously by election as an officer of the French Academy of Science.

• **Owens-Illinois promotion**—Robert N. Sheley, who has had 20 years of service as an architect and engineer for Owens-Illinois Glass Co. (Toledo, Ohio), has been promoted to chief architectural engineer. He succeeds Walter V. Wuellner, who is resigning to establish his own architectural firm.

OBITUARIES

John C. Bowen, 62, executive vice-president, Lehigh Portland Cement Co., stricken by a sudden illness while on a visit to New York from his home in Allentown, Pa., died last month. Mr. Bowen had been a pioneer and a powerful and constructive figure in the cement industry for many years. He went to work for Lehigh as a clerk in 1907, became sales manager and then vice-president in 1926. Mr. Bowen was as widely known among contractors as in his own cement industry.

Elmer C. Buchanan, 66, civil engineer of Seattle, died there Feb. 1. He retired a year ago after 42 years as a civil engineer for the Pacific Telephone & Telegraph Co. Later he had acted as consulting engineer for the R. W. Beck Co.

Robert L. Blum, 71, civil engineer who had supervised the construction work on Cleveland's water filtration plant, died Feb. 4 while in St. Petersburg, Fla.

William O. Krahn, 65, a Milwaukee, Wis., general contractor for 30 years, died there Feb. 1. He was a University of Wisconsin engineering college graduate.

James M. Joyce, 80, vice-president of Cameron, Joyce and Co., Keokuk, Iowa, died recently in that city. The last living member of a pioneer contracting family, he had been actively associated with his firm since the 1880's in the railroad and highway construction business.

Orville R. Lyons, 41, an engineer for the Republic Steel Corp., died Feb. 3 in Cleveland. Formerly he was a research engineer at the Batelle Memorial Institute, Columbus, Ohio.

Emile G. Perrot, 81, engineer and architect, died Feb. 7 at Philadelphia. He developed the unit girder frame system of reinforced concrete which was adopted officially by the U. S. government. His architectural work included buildings at many colleges, industrial plants, and large-scale housing developments. Fordham University, N. Y. City, and St. Joseph's College, Philadelphia, gave him honorary degrees. He was graduated from the University of Pennsylvania in 1895. For many years he lectured there on reinforced concrete, a field in which he pioneered. During World War I he was a designer for the government's Emergency Ship Building Corp.

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CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. O. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
STREETS AND ROADS
March 5 Vermont March 9 Massachusetts

▲ **MAINE**—B.A. 3/4—Maine Turnpike Auth., 17 Bishop St., Portland.

Portland to Augusta (Augusta Exten.)—Sect. 2, Contr. 204, grading, drainage extens. from north of High St. in town of Falmouth near Mile 51 to just north of Rte. 26 in town of Gray near Mile 62 or (b) under two separate contracts. Plans deposit $35.

Contr. 204A—grading, drainage extends from north of High St. in town of Falmouth near Mile 51 to south of Blackstrap Rd. in town of Cumberland near Mile 56. Plans deposit $20.

Contr. 204B—grading, drainage extends from south of Blackstrap Rd. in town of Cumberland near Mile 56 to just north of Rte. 26 in town of Gray near Mile 62. Plans deposit $20. Howard, Needles, Tammen & Bergendoff, 55 Liberty St., New York 5, N. Y., consult. engrs. CD 5/1.

▲ **N. H., Portsmouth**—MAINTENANCE SHOP—B.A. 3/11—U. S. Eng., 857 Commonwealth Ave., Boston, Mass., automotive maintenance shop and AIO compound, Portsmouth Air Force Base, ENG-19-016-54-67. $1,000,000. Plans deposit $15. Alonzo J. Harriman, Inc., 292 Court St., Auburn, Me., engr.-archt. CD 12/27/51.

BIDS ASKED—BUILDINGS

▲ **Conn., Danbury**—SCHOOL—B.A. 3/4—Town Bd. Educ., Arnold McLachin, chn., Danbury, Hayestown Elementary School, off Hayestown Ave. $1,100,000. Philip Nichols Sunderland, Inc., 81 West St., archt.

▲ **Conn., Stamford**—SCHOOL—B.A. 3/23—Office Purch. Agent, City Hall, Stamford, Westover Elementary School, Stillwater Ave. for City, Bd. Educ., 151 Broad St., Stamford, Conn. $1,000,000. William F. P. Ballard, 123 E. 77 St., New York, N. Y., archt. Fraioli-Blum-Yasselman, 113 W. 42 St., New York, N. Y., structural engrs. CD 1/9.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **MAINE**—Maine Turnpike Auth., 17 Bishop St., Portland.

Ernst Constr. Corp., 75 Lathrop St., Buffalo, N. Y. CA $1,597,580. Contr. 207B, CA $1,551,960 Contr. 207C, Sect. 2 steel fabrication for beam span bridges Portland to Augusta. CD 2/3; under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Poorvu Constr Co., Inc.**, 294 Washington St., Boston, Mass. LB $1,659,668. HIGH SCHOOL, River St., BILLERICA, MASS. Town, Town Hall, Billerica, Mass. Bids Feb. 8. CD 1/27.

▲ **Wexler Constr. Co.**, 118 Needham St., Newton, Mass. LB $1,195,000, est. $1,000,000. HIGH SCHOOL, WALPOLE, MASS. Town, High School Bldg. Comm., Joseph Erker Jr., chn., Walpole, Mass. Bids Feb. 11. CD 1/25.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 9 Maryland March 19 Pennsylvania
STREETS AND ROADS
March 2 Maryland March 11 New York
March 19 Pennsylvania

SOON LETS CONTRACT—BUILDINGS

▲ **N. J., Delair**—STEEL PLANT, etc.—U. S. Steel Products Div., U. S. Steel Corp., 525 William Penn Place, Pittsburgh, Pa., soon lets contract steel plant, office bldg., railroad siding, etc. $3,500,000. W. H. Rudolph, c/o owner, ch. engr.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **NEW YORK**—Jones Beach State Parkway Auth., Belmont Lake State Park, Babylon.

Hendrickson Bros., Inc., 63 N. Central Ave., Valley Stream, N. Y., LB $5,077,000. Contr. 6, Southern State Parkway Imprvt., Nassau Co. Bids Feb. 9. CD 1/8.

▲ **Gull Contg. Co.**, 33-15 Lawrence St., Flushing, N. Y. CA $5,817,490. New York Land Sect. No. 2 for Third Tube of Lincoln Tunnel, Contr. LT 160.008, NEW YORK. The Port of New York Auth., 111 8th Ave., New York 11, N. Y. Bids Jan. 19. CD 1/21, under LB.

▲† **Drake-Merritt (Prime Contractor)**, 70 E. 10 St., New York 3, N. Y., announces that due to changes in plans and contract procedures the construction of buildings and airfield facilities, Contr. No. DA-30-075-ENG-2250 at Goose Air Base, Goose Bay, LABRADOR will not be advertised for lump-sum contract bids at this time. CD 2/1, under BA.

▲ **NEW JERSEY and PENNSYLVANIA**—Delaware River Port Authority, Administration Bldg., Camden, N. J.

Booth & Flinn Co., 1942 Forbes St., Pittsburgh, Pa., CA, $3,647,075, Contract No. 3, anchorage superstructure incl. Schedule A, Phila. Anchorage Superstructure; Schedule B, Gloucester Anchorage Superstructure. Bids Jan. 13, CD 1/15, under LB;

American Bridge Div., U. S. Steel Corp., 525 William Penn Pl., Pittsburgh, Pa., CA, $4,768,293, Contract No. 5, cables and suspender ropes, Bids Nov. 12, CD 11/16, under LB;

Bethlehem Steel Co., E. 3 St., Bethlehem, Pa., CA, $7,666,264, Contract 6, suspended structure and decks on Anchorages, Bids Feb. 11, CD 2/17, under LB, all above work for suspension bridge over Delaware River connecting Packer Ave., Phila., Pa. and Gloucester City, N. J. Grand total $16,081,632.

▲ **W. V. Pangborne Co.**, 1927 Montgomery Ave., Phila., Pa. CA $1,872,890, Market St. and Woodland Ave. Subway Station and tunnel lighting and power, etc. Bids 4407 and 4408, PHILA., PA. Dpt. Procurement, City Hall Annex, Phila., Pa. CD 2/3, under LB.

▲† **Frederick Raff Co., Inc.**, 271 Sheldon St., Hartford, Conn. CA $1,207,000, est. over $1,000,000. N.S.A. constr. proj., Utilities Schedule A, incl. sewage treatment plant, central heating plant, Eng-18-020-54-23, FORT GEORGE G. MEADE, MD. U. S. Eng., P.O. Box 1715, Baltimore, Md. Anderson-Nichols & Co., 330 W. 42 St., New York, N. Y., archts. Reisner & Urban, 654 Madison Ave., New York, N. Y., assoc. archts. CD 2/4, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Melwood Constr. Corp.**, 507 Fifth Ave., New York 17, N. Y., LB* $2,609,000, foundations and appurtenances for Bay View HOUSES, Proj. NYC 24, in area bounded generally by Seaview Ave., E. 102 St., Shore Parkway and Rockaway Parkway, excluding northerly portion of area generally bounded by Seaview Ave., E. 102 St., Skidmore Ave. and E. 100 St., BROOKLYN, N. Y. New York City Housing Auth., 64 Park Row, New York 38, N. Y. Bids Feb. 10. CD 2/1.

▲ **Joseph Bisceglia & Sons, Inc.**, 13 Oakland Ave., Harrison, N. Y., CA $1,700,987, general constr. George W. Hewlett HIGH SCHOOL, Hewlett Bay Park, HEWLETT, N. Y. Bd. Educ., Union Free School Dist. 14, Woodmere, N. Y. Bids Jan. 12. CD 1/8.

▲ **Veit Constr. Co. Inc.**, 260 DeVoe St., Brooklyn 11, N. Y., CA $3,000,000. LIBERAL ARTS BLDG., HILLCREST, N. Y. St. Johns University, 75 Lewis St., Brooklyn 17, N. Y. Henry V. Murphy, 1 Hansom Pl., Brooklyn 17, N. Y., archt. CD 6/22.

▲ **Guest Homes, Inc.**, c/o Benjamin H. Whinston, archt. 465 Lexington Ave., New York 17, N. Y. Owner builds. $1,200,000. 99 HOUSES, tract on both sides of Broadway and First Ave. between Illinois and Cypress Aves., MASSAPEQUA PARK, N. Y.

▲ **Salem-Westgate Homes**, c/o Anderson & Smith, archts., 3754 Merrick Rd., Seaford, N. Y. Owner Builds. $1,000,000. 55 HOUSES on tract on Derby Rd., near Port Washington Blvd., PORT WASHINGTON, N. Y.

▲ **Cedarcroft Farms**, Att. Morris Novak, 300 Broadway, Camden, N. J., Separate Contracts, $5,550,000. 500 RESIDENTIAL DEVELOPMENT, Bridgeboro Rd., BRIDGEBORO, N. J. Dante J. D'Anastasio, 1815 Federal St., Camden, N. J., archt.

▲ **Coronet Constr. Co.**, Att. Albert F. Engle, Browning Rd., at Circle, Route 70, Merchantville, N. J. Separate Contracts, $2,000,000, RESIDENTIAL DEVELOPMENT, Main and Penns Aves., ERLTON, N. J. Dante J. D'Anastasio, 1815 Federal St., Camden, N. J., archt.

▲ **Walter Kidde Constructors, Inc.**, 140 Cedar St., New York, N. Y., CA, $1,000,000, ground-level and 4 story OFFICE, MORRISTOWN, N. J. Beneficial Management Co., 15 Washington St., Newark, N. J. Epple & Seaman, 901 Broad St., Newark, archts. and engrs. CD 5/21.

▲ **June-Meadows Corp.**, 370 Montgomery Ave., Merion, Pa. Separate Contracts. $2,500,000. RESIDENTIAL DEVELOPMENT, Fox Chase Rd., etc., ABINGTON, PA. Jack Swerman, 305 Market St., Chester, Pa., archt.

▲ **John McShain, Inc.**, 17th and Spring Garden Sts., Phila., Pa., CA $3,250,000. Broad St. Suburban STATION BLDG., misc. alterations, PHILA., PA. Pennsylvania R.R., J. L. Gressitt, ch. engr., Suburban Station Building, 1617 Pennsylvania Blvd., Phila. 4, Pa. CD 9/13/51.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction
(Name in order of Listing)

Water Supply	Latin America
Sewers, Waste Disposal	Public Buildings
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects invloved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
B.A.	Bids Asked
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 17 Louisiana
STREETS AND ROADS
March 17 Louisiana

BIDS ASKED—BUILDINGS

▲ **Ga., Athens**—HOUSING—B.A. 3/11—Athens Housing Auth., Broad St., 256-unit housing, Projects GA-3-3 and GA-34. $2,000,000. Plans deposit $100. CD 9/1.

▲ **Ga., Atlanta**—HOUSING—B.A. 4/1—Atlanta Housing Auth., Atlanta Title Bldg., 510 housing units, $4,500,000. CD 9/1.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **J. W. Moorman & Son**, Belmont, Texas, CA, $1,763,064 constr. earth dam for Buford Dam on Chattahoochee River, Buford, ENG-01-076-54-33, GEORGIA, U. S. Eng., P.O. Box 1169, Mobile, 7, Ala. Bids Feb. 9. CD 2/16, under LB.

▲† **U. S. Eng.**, P. O. Box 1169, Mobile, Ala., rejected bids Jan. 12, AMC warehouse, roads, etc. Brookley Air Force Base, MOBILE, ALA. LB, $2,116,508. CD 1/26, under LB.

▲ **T. L. James & Co.**, P.O. Drawer 8, Kenner, La. CA $2,600,000. veterans memorial hy., GRETNA, LA. Jefferson Parish Police Jury, Gretna, La. CD 12/7, under LB.

▲ **KENTUCKY-ILLINOIS**—State Hy. Dpt., Dpt. Hys., Frankfort, Ky.,

Traylor Bros., Upper Mt. Vernon Rd., Evansville, Ind. CA $1,036,563 substructure;

Allied Structural Steel Co., 20 N. Wacker Dr., Chicago, Ill. CA $2,693,864. superstructure for toll bridge between Shawneetown, Ill. and Union Co., Ky. Bids Feb. 5, awarded Feb. 11. CD 2/10, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Kessler Realty**, 501 W. Grace St., Richmond, Va. Owner Builds. Approx. $2,200,000. 188 one story, masonry RESIDENCES, near RICHMOND, VA.

▲ **J. L. Ewell Engr. & Contg. Co.**, 1248 New Tampa Hy., Lakeland, Fla., LB, $1,470,077, Senior HIGH SCHOOL,

(Continued on page 52)

Double-Action DRAGSHOVEL WITH A QUICK-CONVERSION BONUS

THE Bucyrus-Erie Hydrohoe not only pays its way as a dragshovel, but it has been converted to crane front-end by one man in less than one hour (actual time test). For example, with a Hydrohoe you can dig trenches or footings in the morning, then convert to crane front-end and set pipe, erect bridge sections or handle road forms in the afternoon.

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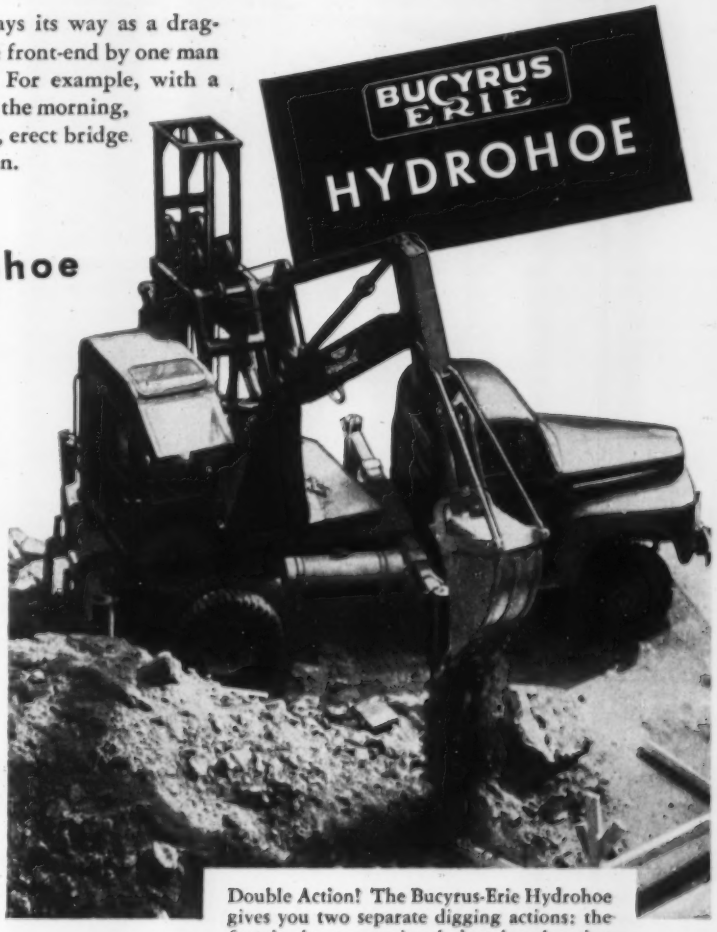

Double Action! The Bucyrus-Erie Hydrohoe gives you two separate digging actions: the first is the conventional dragshovel action of the dipper moving through its digging arc; the second, a separate horizontal stroke, obtained by telescoping the boom. Unit is available with both 18- and 12-in. wide bucket.

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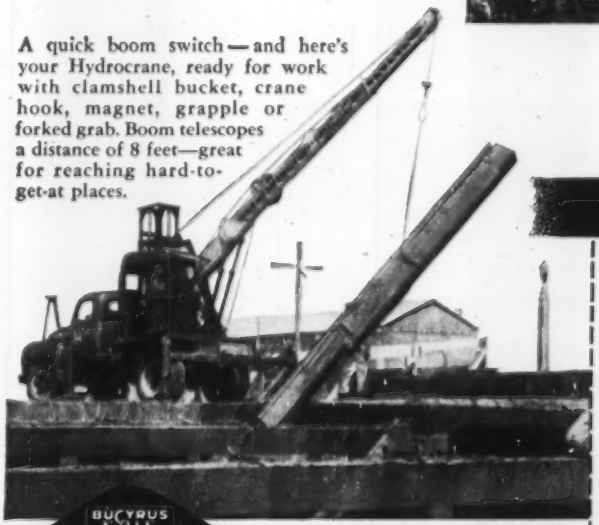

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GARWOOD, N. J. — BRANTFORD, ONT. — AKRON, IND.

(continued from page 50)

Plant City, Tampa, Fla., Hillsborough Co. Bd. P. Instructions, Court House, Tampa, Fla. Bids Feb. 2. CD 2/13.

▲ **C. F. Braun & Co.**, 1100 S. Fremont St., Alhambra, Calif. CA Est. $12,000,000. fluid hydroformer REFINING UNIT to produce high octane gasoline components, BATON ROUGE, LA. Esso Standard Oil Co., North Baton Rouge, La. CD 3/6/52.

▲ **R. P. Farnsworth & Co.**, 1515 S. Salcedo St., New Orleans, La. CA Est. $1,500,000. 250 RESIDENCES, NEW ORLEANS, LA.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

March 9 Wisconsin

STREETS AND ROADS

March 9 Wisconsin

BIDS ASKED—BUILDINGS

▲ **Mich., Ann Arbor**—HOSPITAL—B.A. 3/16—State, University of Michigan Bd. Regents, W. K. Pierpont, vice pres., brick, steel, concrete children's hospital for psychiatric treatment. $2,000,000. Plans deposit $50 refundable. Swanson Assoc., West Long Lake Rd., Bloomfield Hills, archts. CD 7/14.

▲ **Wis., Madison**—COMMERCE—B.A. 4/1—University of Wisconsin, Madison, 2 and 3 story, bsmnt., 519x 204 ft., U-shaped commerce bldg. $1,750,000. Law, Law, Potter & Nystrom, 121 S. Pinckney St., archts.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Fodor Realty Co.**, 3324 Lorain Ave., Cleveland, O. Own Forces. $1,500,000. 100 HOMES and exten. roadway on Puritas Ave., CLEVELAND, O.

▲ **Ridgemont Development Corp.**, Samuel S. Bankle, pres., 631 Penobscot Bldg., Detroit, Mich. Owner Builds. $7,000,000. four hundred 1 and 2 story HOMES and BUSINESS BLDGS., on 90 acre Ridgemont Golf property, EAST DETROIT, MICH.

▲ **Fair Lake Development**, Robert E. Baker, pres., 36 Radnor St., Grosse Pointe, Mich. Owner Builds. $4,000,000. 83 HOMES, GROSSE POINTE SHORES, MICH.

▲ **Rail Development Corp.**, Bay City, Mich. Owner Builds. $2,600,000. brick, brick veneer APARTMENTS, in sections of 6 bldgs. and 105 apartments, MIDLAND, MICH.

▲ **Cunningham-Limp Co.**, 3087 W. Grand Blvd., Detroit, Mich. CA Est. $2,000,000. 1 story, brick, steel, concrete POWER PLANT addn., MUSKEGON, MICH. Continental Motors Corp., 1470 Algonquin St., Detroit, Mich. CD 11/30.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

▲ **Texas**—OIL LINE—Bids Asked—Cities Service Pipe Line Co., Bartlesville, Okla., 60 mi. 12 in. welded joint crude oil line, 48,000 bbl. capacity daily, Sour Lake to Houston area, $1,800,000; tank farm, six 120,000 bbl. each capacity, floating roof type tanks, $375,000; pumping stations, $325,000, both near Houston. CD 11/10.

BIDS ASKED—BUILDINGS

▲ **Mont., Billings**—BANK and OFFICE—B. A. Early in March—First Building Corp., 400 First National Soo Line Bldg., Minneapolis, Minn., 8 story, rein.-con., Indiana limestone, granite facing bank and office bldg. $2,000,000. Orr Pickering & Assoc., Fratt Bldg., Billings, archts. CD 2/25/53, under First Bank Stock Corp. as owner.

▲ **Wyo., New Castle**—EXTRACTION PLANT, etc.—Bids Asked—Homer S. Head Co., Gulf Bldg., Houston, Tex., natural gasoline extraction plant, $4,500,000; warehousing and plant repair shop, $100,000; some crude oil and gas lines, $85,000; 35 mi. southwest of here.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ † **C. H. Leavell & Co.** 1900 Wyoming St., El Paso, Tex., and **Leavell Coal Co.**, 424 S. Chey St., Tulsa, Okla. LB $1,492,446, hangar at Naval Air Station, Spec. 35939, LINCOLN, NEB. Ninth Naval Dist., Great Lakes, Ill. Bids Feb. 12. CD 1/19.

▲ † **Amis Constr. Co.**, 1647 Exchange St., Oklahoma City, Okla. and **San-Ore Constr. Co.**, 200 E. Kansas Ave., McPherson, Kan., CA $3,551,644, combination pavement with rigid pavement, North-South Runway, Lincoln Air Force Base, Inv. 25-066-54-40, LINCOLN, NEB. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Feb. 9. CD 2/12, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Woermann Constr. Co.**, 3800 West Pine Blvd., St. Louis 8, Mo. CA Est. $2,000,000. 5 story John Fowler Memorial HOSPITAL addn. across entire front existing hospital, connections to east and west wings and central bldg., ST. LOUIS, MO. St. Luke's Hospital, Robert Brookings Smith, pres., 5535 Delmar Blvd., St. Louis 12, Mo. CD 12/22, under LB.

▲ **Melvin H. Glick & Co.**, 44 N. Brentwood Blvd., Clayton 5, Mo. Owner Builds. $3,000,000. 200 brick, concrete RESIDENCES in Oak Estates Subdivision adjacent to Old Bonhomme and Olive St. Rds. in ST. LOUIS COUNTY, MO.

▲ **Badger Process Div. of Stone & Webster Eng. Corp.**, 49 Federal St., Boston 7, Mass., CA. ETHYLENE UNIT with power plant water cooling tower, circulating sys., sewers and pipe lines at Refinery here;
Fluor Corp., 2500 Atlantic Ave., Los Angeles, Calif., CA, PLATFORMING PLANT, PORT ARTHUR, TEX. Gulf Oil Corp., Port Arthur, Tex. Total est. $14,000,000. CD 7/24, under LB.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 11 California
STREETS AND ROADS
March 10, 11 California

BIDS ASKED—BUILDINGS

▲ **Calif., Bakersfield** — HOSPITAL — B.A. 3/9 — Bd. Supervs. Kern Co., R. J. Veon, clk., Court House, 5 story, Kern County Hospital. $3,000,000. Plans deposit $150. C. B. Alford & M. J. Thomas, 602 Haberfield Bldg., Bakersfield, archts. Walker, Kalionzes & Klingerman, 488 S. San Vicente Blvd., Los Angeles, consult. archts. CD 2/12.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **Allis-Chalmers Mfg. Co.**, 1126 S 70 St., Milwaukee, Wis., LB, $1,207,750, Schedule 1, hydraulic turbine with pressure regulator and energy absorber, Boulder Canyon Proj., Spec. DS4084, ARIZONA, CALIFORNIA and NEVADA. Bureau Reclamation, Dpt. Interior Bldg. 53, Denver Federal Center, Denver, Colo. Bids Feb. 4. CD 11/30.

▲† **Guy F. Atkinson Co. & Ostrander Constr. Co.**, 10 W. Orange St., South San Francisco, Calif., LB $2,057,080, install embedded turbine parts, Units 9 to 14, McNary Dam, Umatilla Co., Civeng-45-164-54-31, OREGON. U. S. Eng., City-County Airport, Walla Walla, Wash. Bids Feb. 11. CD 1/27.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **James Stewart Co.**, Employer's Insurance Bldg., Dallas, Tex., LB, $2,740,000, 10 story, bsmnt., structural steel, face brick BANK, PHOENIX, ARIZ. First Bank Building Corp. of Phoenix, First National Bank of Arizona, 16 North 1 Ave., Phoenix, Ariz. Bids Feb. 10. CD 1/13.

▲ **Strand & Sons**, 3939 University Way, Seattle 5, Wash., CA, $1,440,623, general contract;
Cree Plumbing & Heating Co., 2223 W. 61 St., Seattle, Wash., CA, $320,175, mechanical work for 3 story HIGH SCHOOL in north end, SEATTLE, WASH. Catholic Diocese of Seattle, 906 Terry Ave., Seattle 4, Wash. Bids Feb. 9. CD 1/21.

▲ **Gain Corp.**, 945 N. La Cienega Blvd., Los Angeles, Calif., Owner Builds. $1,310,400, 144 stucco DWELLINGS, Loukelton, Alberon and Ocala Sts., PUENTE, CALIF.

▲ **Hadley-Cherry, Inc.**, 8754 Beverly Blvd., Los Angeles, Calif., CA, $1,911,000, 273 stucco DWELLINGS, Cypress, Ellen, Clovermead, Kingside, Edna Sts., WEST COVINA, CALIF. Valinda Park Homes, 8754 Beverly Blvd., Los Angeles, Calif.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

▲ **Man., Winnipeg**—B.A. 3/9—City, City Hall, superstructure for 453 ft. bridge, 170 ft. central span, 46 ft. roadway, 8 ft. sidewalks on each side across Assiniboine River at Hargrave St., $1,700,000. Plans deposit $5. J. B. Striowski, c/o owner, city engr. W. Walkden, 91 Ferndale Ave., engrs. CD 12/10.

BIDS ASKED—BUILDINGS

▲ **Que., Valcartier**—BARRACK BLOCKS—B.A. 3/4—Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont.; 250-man barrack blocks, Nos. 2 and 3 and 500-man mess No. 1 at Army Camp, $2,100,000. Plans deposit $100.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **British Insulated Callenders Cables Ltd.**, Norfolk House, London, W. C. 2, England, CA, $3,000,000 77-mi. 138,000 volt gas-pressure cable, submarine cable, Vancouver to Nanaimo, BRITISH COLUMBIA. British Columbia Electric Co. Ltd., 425 Carroll Ave., Vancouver, B. C. CD 2/1.

▲ **English Electric Co. of Canada Ltd.**, 129 Adelaide St. W., Toronto, Ont., CA, $1,800,000, supply 4 turbines power development, Bersimis River, Baie Comeau, QUEBEC. Quebec Hydro-Electric Power Comn., 107 Craig St. W., Montreal, Que. H. G. Acres & Co., 2135 Culp St., Niagara Falls, Ont., engrs. CD 10/9/52.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Canada Constr. Co. Ltd.**, 352 Munster St., Islington, Ont., CA, $1,123,000, 5 story T-shaped 50x200 ft., 50x90 ft., Scarborough General HOSPITAL, Lawrence Ave. E., TORONTO, ONT. Sisters of Misericode, St. Mary's Hospital, 550 Jarvis St., Toronto, Ont. Awarded Feb. 10. CD 3/3/52.

▲ **Canadian Bridge Co. Ltd.**, 219 Walker Rd., Walkerville, Ont., structural steel;
Dinsmore Constr. Ltd., McDougall St. and CPR, Windsor, Ont., CA, general contract, part 1 and part 2 story,

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520x600 ft. steel, frame, concrete FACTORY, WINDSOR, ONT. Chrysler Corp. of Canada Ltd., 2450 Chrysler Centre, Windsor, Ont. Total est. over $2,000,000. Bids Feb. 9, awarded Feb. 10. CD 2/1.

▲ **Forest Homes Ltd.**, 600 Abercorn Ave., Montreal, Que., CA, $2,400,000, 200 HOUSING UNITS, Lavesque Blvd., ST. VINCENT DE PAUL, QUE. E. Bujord, 6904 Molson St., Montreal, Que., archt.

U. S. POSSESSIONS

BUILDINGS

LOW BIDS AND CONTRACTS

▲† **Framorco, Inc.**, Apartado, 1293, Panama, Republic of Panama. CA $1,458,964, ORDNANCE FACILITIES, Inv. 54-18, COROZAL, CANAL ZONE. U. S. Eng., Box 4970, Jacksonville, Fla. Bids Nov. 10. CD 12/11, under LB.

Proposed Projects

WATER SUPPLY

▲ † **D. C., Wash.**—U. S. Eng., First and Douglas Sts. N. W., constr. Little Falls Pumping Station; Dam and Tunnel, Montgomery, Md., $3,000,000; new chemical building at McMillan Reservation $200,000-$500,000; plans by Greeley & Hanson, 220 S. State St., Chicago, Ill., intake and control chamber at Dalecarlia Pumping Station, $3,000,000-$5,000,000. 2/25/54.

▲ **Mo., Springfield**—Springfield City Water Co., 710 Boonville St., Springfield, reservoir. $2,500,000. Alvord, Burdick & Howson, 20 N. Wacker Dr., Chicago, Ill., consult. engrs. CD 3/18/52.

▲ **Tex., Austin**—City, City Hall, voted bonds Jan. 30, water storage, pumping imprvs., $450,000; water distr. lines extens., $2,750,000. CD 1/29.

SEWERS, WASTE DISPOSAL

▲ **Calif., Sunnyvale**—City, City Hall, Sunnyvale, voted $1,500,000 bonds, sewage disposal plant. CD 11/20.

▲ **O., Cincinnati**—City and Hamilton Co., City Hall, Duck Creek sewer extending from B. & O. R. R. at Enyart Ave. to Little Miami Interceptor Sewer at Lunken Airport. $8,500,000. T. J. Montgomery, city engr. CD 10/28/52.

▲ **Tex., Austin**—City, City Hall, voted bonds Jan. 30, sanitary sewer collection lines exten., $1,250,000; sanitary sewer disposal units, $250,000. CD 1/29.

STREETS AND ROADS

▲ **INDIANA**—Indiana Toll Road Comn., State House Annex, Indianapolis, 156 mi. 4-lane Indiana Toll Road to connect with Ohio Turnpike and Illinois State Line. $240,000,000. Engineers will design and supervise contractions are;

Sub-section (1A) De Leuw, Cather & Co., 150 N. Wacker Dr., Chicago, 6, Ill.;

Sub-section (1B), Richardson, Morehouse, Ramsey & Fisher, 401 Liberty Ave., Gateway Center, Pittsburgh, 22, Pa., Moran, Proctor, Mueser & Rutledge, 420 Lexington Ave., New York, 17, N. Y., Harry A. Balke, 800 Broadway, Cincinnati, O.;

Section 2, J. Stephens Watkins, 251 E. High St., Lexington, Ky. and Modjeski & Masters, State St. Bldg., Harrisburg, Pa.;

Section 3, Hazelet & Erdal, Monadnock Block, Chicago, Ill.

Section 4, Alfred Benesch & Assoc., 30 E. Adams St., Chicago, Ill.

Section 5, Charles W. Cole & Son, 220 W. La Salle St., South Bend, Ind. and Pierce & Gruber, Hume-Mansur Bldg., Indianapolis 4, Ind

Section 6, Frank J. Kornacker & Assocs., 53 W. Jackson St., Chicago, Ill.

Section 7, Clyde E. Williams & Assoc., 312 W. Colfax Ave., South Bend, Ind.

Section 8, Vogt, Ivers, Seaman & Assocs., 2 National Bank Bldg., South Bend, Ind.

Section 9, Hardesty & Hanover, 101 Park Ave., New York 17, N. Y. Andres, Clark & Buckley, 305 E. 63 St., New York, N. Y.

Section 10, Brown & Blauvelt, 468 4 Ave., New York, 16, N. Y.

Section 11, W. H. McFarland, Press Bldg., Binghamton, N. Y. J. E. Greiner Co., 1106 N. Charles St., Baltimore, Md., made cost study. Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York, N. Y., made traffic studies. CD 1/12.

AIRPORTS

▲† **Utah, Hill Air Force Base**—HANGAR, etc.—U. S. Eng., Fort Douglas, 75,000 sq. ft. masonry, steel, concrete aircraft painting and cleaning hangar, $2,186,000; 60,000 sq. ft. masonry, concrete, steel accessories overhall hangar, $793,000, plus $286,000 utilities.

PUBLIC BUILDINGS

▲† **Idaho, Arco**—BUILDINGS, etc.—Atomic Energy Comn., Idaho Operations Office, Idaho Falls, building and service facilities for initial engine test area of Aircraft Nuclear Propulsion Project, National Reactor Testing Station. $2,500,000-$3,000,000. CD 3/24/49.

▲ **Mich., Gladstone**—POWER PLANT—City, Municipal Electric Dpt., R. J. Hendrickson, city mgr., Gladstone, plans by Pfeifer & Schulz, Wesley Temple Bldg., St. Paul, brick, steel, concrete power plant electric generating station. $2,200,000.

▲ **Mo., St. Louis County**—HEALTH and WELFARE STRUCTURES—St. Louis County, Court House, Clayton, Zone 5, voted bonds health and welfare structures, $3,458,500. CD 9/18.

▲ **Tex., Austin**—AUDITORIUM—City, City Hall, voted bonds Jan. 30, city auditorium, $1,750,000. CD 1/29.

▲ **Tex., Austin**—ELECTRIC PLANT—City, City Hall, voted bonds Jan. 30, electric power and lighting plant and sub-stations expansion and imprvs. $4,860,000.

▲ **Wis., Green Bay**—SCHOOL—Bd. Educ., 523 Howe St., Junior High School. $1,500,000.

▲ **Man., Winnipeg**—HOSPITAL—Dpt. Veterans Affairs, Headquarters Bldg., Winnipeg, plans by Moody & Moore, 295 Broadway Ave., concrete, steel, brick Deer Lodge Veterans Hospital addn., with tunnel connecting with existing hospital, in suburban St. James Area. $4,500,000. CD 2/18/53.

COMMERCIAL BUILDINGS

▲ **Md., Silver Spring**—OFFICE—Cameron Building Corp., 934 Ellsworth Dr., plans by Fon J. Montgomery, 10018 Menlo Ave., 5 story, granite, limestone office, Georgia Ave. and Cameron St. $1,700,000.

▲ **N. J., Toms River**—HOSPITAL—Community Memorial Hospital Com., 31 Main St., plans by Bolton Martin & White, 266 S. 17 St., Phila., Pa., hospital. $1,147,145. CD 8/26.

▲ **N. Y., New York**—LAW—Columbia University, 116 St. and Broadway, School of Law Bldg., Morningside Dr. between 117 and 118 Sts., $6,000,000-$7,000,000.

▲ **O., Toledo**—HOSPITAL—Toledo Hospital, North Cove Blvd., plans by Ellerbe & Co., E505 First Nat'l.Bank Bldg., St. Paul, Minn., 180 bed expansion and modernization program of hospital, $4,500,000. Bellman, Gillett & Richards, 518 Jefferson St., assoc. archts. CD 12/27/51.

▲ **Tenn., Knoxville**—STORE—Rich's, Inc., Forsyth St., Atlanta, Ga., department store, $6,000,000.

▲ **Tex., Houston**—APARTMENT UNITS, etc.—J. S. Adams & Co., 6113 Youpon St., 37 apartment units, $365,200; 34 apartment units, $338,625; 45 apartment units, $450,000; 26 apartment units, $325,000; plans by Jim Gault, 2419 South Blvd., 75,000 sq. ft. masonry shopping center, $1,000,000, foregoing at S. P. Ry. Crossing.

▲ **Tex., Orange**—HOTEL—Orange Community Hotel Co., Orange, plans by Golemon & Rolfe, 5100 Travis St., Houston, 5 to 6 story 100-room hotel, swimming pool, etc. $1,300,000.

▲ **Ont., Toronto**—APARTMENT DEVELOPMENT—Crosstown Constr. Co., c/o Venchiarutti & Venchiarutti, archts., 2941 Bathurst St., apartment development incl. 10 buildings, 750 suites, Eglinton Ave. W. and Trethewey Dr., $8,000,000.

▲ **Ont., Toronto**—HOTEL etc.—Dominion Hotels & Developments Corp., c/o Page & Steel, archts. 72 St. Clair St. W., 10 story, 240 room hotel, shopping center, roof restaurant, Yonge St. between Wood and Alexander Sts., $3,500,000.

▲ **Ont., Toronto**—APARTMENT—Wayne Building Developments Ltd., 2100 Bathurst St., 14 apartments incl. 340 suites, at Jane St. and Wilson Ave. $4,000,000. Marshall Macklin & Managhan, 154 Merton St., consult. engrs.

INDUSTRIAL BUILDINGS

▲ **Calif., Sunnyvale**—PLANT—Pacific Can Co., W. T. Colvin, vice pres. 290 Division St., 200,000 sq. ft., mfg. plant and other space, incl. office, $2,000,000.

▲ **Ky., Lexington**—STEAM ELECTRIC PLANT—Kentucky Utilities Co., 159 Main St., 424,000 kw steam-electric plant in Mercer Co., near here, $60,000,000.

▲ **Mich., Detroit**—PLANT—Cadillac Motor Div., General Motors Corp., 2860 Clark St., plans by Smith, Hinchman & Grylls, 800 Marquette Bldg., 600,000 sq. ft. Clark Street Plant addn. $7,000,000.

▲ **B. C., Vancouver Island**—PULP MILL—British Columbia Forest Products Ltd., 995 West 6 Ave., Vancouver, pulp mill $25,000,000.

UNCLASSIFIED

▲ **Montana**—RURAL DISTRIBUTION LINES—Glacier County Electric Co-operative, Cut Bank, 303 mi. rural distr. lines, 35 mi. transmission lines, Glacier Co. $1,180,000, J. A. Fussell Jr., Havre, consult. engr. CD 1/8.

▲ **Tex., Austin**—ELECTRIC DISTR. SYS.—City, City Hall, voted bonds Jan. 30, electric distr. sys. extens. and imprvs., largely cable lines. $4,250,000. CD 1/29.

▲ **British Columbia**—RAILWAY—Pacific Great Eastern Ry. Co., W. A. C. Bennett, pres., 736 Granville St. Vancouver, and B. E. Valde, acting ch. engr., Squamish, exten. railway to North Vancouver from Squamish to Peace River from Prince George, $10,000,000. CD 4/15/47.

(Proposal Advertisements see pp. 59 and 60)

UNIT PRICES

Prices rise on second N. Y. tunnel contract

The prices of thirty items in the second land section contract for the third tube of the Lincoln Tunnel, New York City, show an average rise of 9% over the prices of the same items in the first land section contract, awarded in August, 1952 (ENR 10-23-52). Gull Contracting Co., Inc., Flushing, N. Y., submitted the low bids on both contracts. The job was awarded for $5,817,490 by the Port of New York Authority.

Work consists of open cut excavation in earth and rock and the construction of a portion of the steel bent sections for the third tube of the Lincoln Tunnel. The open cut will be 1,250 ft long with excavation 90-ft deep. In the course of the work, New York Central Railroad tracks will be underpinned and service maintained.

Of the thirty items, fifteen showed an increase averaging 32% per item, 12 declined 18% per item, and three were bid exactly the same.

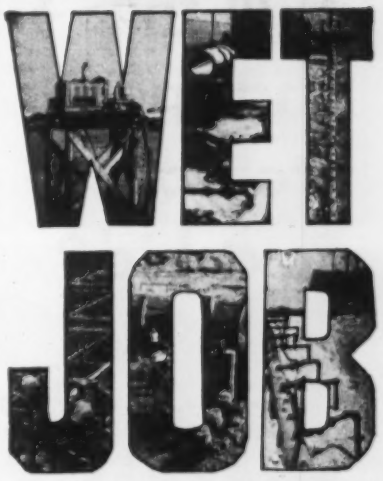
However, of the seven items falling in the class above $100,000, only two showed increases averaging 8% per item and five declined an average of 7% per item. Those increasing were brick-in-mastic waterproofing and reinforcing rods; while excavation, both earth and rock; girders, columns, etc.; cement; and concrete all declined.

In this area hoisting engineers are receiving $3.84 per hr; electrical workers, $3.63 per hr; carpenters, $3.57 per hr; and common laborers, $2.41 per hr. Work started January 19 and will be completed in 720 calendar days. Bidders include:

1C	Gull Contr. Co., Flushing, N. Y.	$5,817,490
2	Tully & DiNapoli, Flushing, N. Y.	5,927,429
6	Slattery Rock Corp., Maspeth, N. Y.	6,838,000

Bids: 1-19-54 Item	Unit	Quantity	Unit Prices 1C	2
Earth exc for stl bent sec	cy	15,500	$19.00	$25.00
Rock exc for stl bent sec	cy	70,500	19.00	25.00
Earth exc for plaza	cy	17,000	9.00	14.00
Rock exc for plaza	cy	23,000	14.00	14.00
Permanent underpinning	cy	125	250.00	150.00
Repair existing bldg foundation walls	cy	200	130.00	100.00
Porous conc pipe drains	lf	2,350	8.00	3.00
Reinf conc pipe drains, 12"	lf	380	9.00	4.00
15"	lf	90	10.00	5.00
Girders, columns, rolled beams, ceiling beams, channels, tie rods & truss members in steel bent section	lb	4,900,000	0.124	0.15
Tunnel roadway beams	lb	430,000	0.10	0.10
Tunnel roadway curbs	lf	2,580	7.00	7.50
Misc str steel	lb	20,000	0.60	0.50
Reinforcing rods	lb	1,100,000	0.17	0.17
Wire mesh	lb	65,000	0.35	0.27
Iron castings	lb	14,000	0.25	0.20
Steel castings	lb	6,000	0.65	0.60
Ceiling hangers	ea	139	30.00	20.00
Cement	bbl	38,500	4.20	4.25
Concrete	cy	21,200	38.00	45.00
Membrane wtrprfng, 2-ply	sy	6,760	2.00	2.00
3-ply	sy	3,420	2.50	2.40
4-ply	sy	9,700	4.25	3.20
Brk-in-mastic wtrprfng	cy	2,040	110.00	106.00
Precast concrete forms	sf	25,800	1.50	0.85
Concrete block	sf	500	3.00	1.20
Cement plaster	sf	600	1.50	0.50
Copper drains & flashing	lb	2,600	2.00	1.00
Ceiling tile	sf	31,600	2.50	3.00
Conc plaza pavement	sy	1,300	10.00	10.00
Bit plaza pavement	sy	900	7.00	5.00
Concrete plaza curbs	lf	550	4.00	1.50
Street roadway pavement	sy	8,000	5.00	4.00
Street curbs	lf	2,300	3.00	1.50
Street sidewalks	sy	1,000	5.50	3.00
Fresh air flues	ea	221	120.00	100.00
Exhaust air ports, type 3N	ea	94	60.00	35.00
Tunnel service pipe, 8"	lf	1,500	12.00	7.00
CI hydrant service pipe, 6"	lf	300	8.00	5.00
Brass pipe, 2½"	lf	250	10.00	8.00
Silicon bronze conduit, 1"	lf	1,200	3.50	3.30
Steel conduit, 1½"	lf	5,600	2.50	2.20
2"	lf	1,250	3.00	2.50
2½"	lf	3,500	3.30	3.00
4"	lf	900	5.00	4.60
Asb cmt conduit, 4"	lf	11,000	1.60	1.45
CI tunnel boxes, type O-13	ea	9	100.00	90.00
O-14	ea	6	260.00	250.00
O-15	ea	6	125.00	112.00
O-16	ea	160	40.00	30.00
Exc for utilities	cy	1,500	20.00	15.00
Concrete for utilities	cy	1,000	90.00	50.00
Reinf rods for utilities	lb	90,000	0.18	0.20
Wire mesh for utilities	lb	300	0.50	0.30
Furn misc stl for util	lb	7,000	0.60	0.40
Install misc stl for util	lb	20,000	0.25	0.25
Furn CI valves boxes & sewer MH covers & frames	lb	6,000	0.25	0.20
Install CI valve boxes & MH covers with frames for utilities	ea	60	50.00	25.00
Bri masonry for utilities	cy	40	120.00	100.00
Vit bri lining for sewers	sf	900	2.00	2.20
Vit liner plates for sew	sf	2,800	1.50	1.50
Vit clay pipe, for utilities 4"	lf	45	3.00	1.00
12"	lf	65	5.00	3.00
House sewer connections	ea	22	200.00	200.00
Furn CI water pipe	lb	67,000	0.20	0.10
Lay CI water pipe, 12"	lf	1,100	6.50	2.00
20"	lf	860	15.00	6.00
Steel water pipe, 12"	lf	130	25.00	20.00
16"	lf	130	50.00	30.00
Water service connections	ea	22	200.00	225.00
Maint & restore or relocate fire hydrants	ea	6	300.00	150.00
Temporary street lights	ea	5	400.00	360.00
Maint & restore or relocate traffic signals	ea	3	400.00	210.00
fire alarm boxes	ea	1	500.00	234.00
Underground gas pipe by-passes, 6"	lf	80	6.00	5.00
Surface gas pipe by-passes 4"	lf	300	5.00	3.00
6"	lf	750	6.00	4.00
Overhead gas pipe by-pass 10th Ave & 38 St	ls	1	15,000	2,000
11th Ave & 38 St	ls	1	20,000	2,500
Install CI gas pipe, 6"	lf	1,300	2.50	2.00
8"	lf	120	3.50	2.50
10"	lf	130	5.00	3.00
Install stl gas pipe, 18"	lf	130	10.00	5.00
20"	lf	130	12.00	10.00
24"	lf	180	12.00	15.00
30"	lf	110	15.00	20.00
Gas house service connec	ea	16	200.00	200.00
Install precast transformer manholes	ls	1	300.00	250.00
Maint iron & stl ducts & cables	lf	14,000	3.00	0.30
Maint Con Ed cables in wood troughs	lf	2,400	5.00	5.00
Maint N. Y. Tele Co. cables in wood troughs	lf	3,300	5.00	5.00
Maint fire dept cables in wood troughs	lf	200	5.00	3.50
Wood MH incl cable maint	eg	29	700.00	350.00
Install Con Ed teleg & Elec Subway Co stl ducts, 2"	lf	350	2.50	2.20
Install Empire City Subway Co stl ducts, 3"	lf	20	4.00	3.80
3½"	lf	600	2.00	1.80
Install Con Teleg & Elec Subway Co stl ducts, 4"	lf	30	5.00	4.80
Install Empire City Subway Co split stl ducts, 3½"	lf	130	4.00	3.50
Install Con Teleg& Elec Subway Co precast conc ducts	lf	6,700	2.00	1.85
split precast conc ducts	lf	1,000	2.00	2.40
Install Empire City Subway Co tile ducts, 3"	df	8,500	1.00	0.35
split tile ducts, 3"	df	1,000	1.50	0.50
Port Auth galv stl feeder ducts, 4"	lf	4,300	3.50	3.15
Sheet asph pvmnt on 6" conc base	sy	100	20.00	10.00
Granite block pvmnt on 6" conc base	sy	120	25.00	10.00
on 1" sand cushion	sy	40	20.00	10.00
Conc sidewalks for utilities 4"	sy	400	14.00	5.00
8"	sy	20	15.00	8.00
Unclassified work	ls	1	730,000	238,000

IF IT'S A



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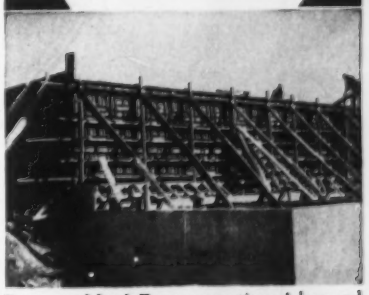

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Construction boom in New York State based on public, commercial work

Construction business in New York State, which is second only to Texas in volume of 1953 awards, has been rolling along at a fast pace during the last three years. The table (below) shows the trend of awards, which last year were almost 10% of the U.S. total. The only important categories to show serious declines during this period are federal work and industrial building. Federal work in 1953 was running about half its 1951 volume. And industrial awards declined very sharply in 1952, though they picked up a little last year.

Much of the 24% gain in 1953 awards over 1952 was accounted for by a sharp increase in state and municipal work, mostly in highway construction. However, there was a sizable gain in private work as well, accounted for almost entirely by greater commercial building.

Some clues to the probable trend of future awards can be found in ENR's backlog. The backlog for New York rose by $801 million last year to a total of $8,253 million. That's about 11% of the total U.S. backlog. Commercial building and private mass housing, which are combined into one figure in the backlog, were the fastest growing category. The combined total rose $394 million during 1953, up 29%.

Most of the rest of the gain in the backlog was due to the $315-million power plant on the St. Lawrence River proposed by the New York State Power Authority.

• **New York backlog**—Public buildings—including schools and hospitals—are the largest item in the New York backlog. They increased about 3% in 1953. The highway and bridge backlogs dropped in 1953 because of the large volume of work going into contract. There is also a sizable increase in backlogs of public and private unclassified. However, the industrial building backlog at the end of the year was about the same as at the close of 1952. The same was true for waterworks and sewerage. The backlog for federal work dropped slightly during 1953.

New York State heavy construction booms in '53

Record heavy construction volume rises 24% over 1952 . . . . . highways, bridges, sewerage and commercial building show biggest increases

	1951	1952 (millions)	1953	% change '51-'52	% change '52-'53
All construction contracts...	**$826.3**	**$1,166.4**	**$1,451.2**	**+41**	**+24**
By ownership					
Public	**328.2**	**480.2**	**706.6**	**+46**	**+47**
State & municipal	264.0	431.6	674.0	+63	+56
Federal	64.2	48.6	32.6	−24	−33
Private	**498.1**	**686.2**	**744.6**	**+38**	**+9**
By type of work					
Public works					
Waterworks	7.4	4.1	5.0	−45	+22
Sewerage	15.2	11.7	27.9	−23	+138
Bridges*	20.6	64.3	75.8	+213	+18
Highways	33.2	129.5	352.3	+290	+172
Earthwork, waterways	4.5	4.8	4.7	+8	−4
Buildings	50.7	71.0	49.3	+40	−31
Housing	142.9	153.9	140.2	+8	−9
Unclassified	53.7	40.9	51.4	−24	+26
Private construction					
Industrial building	138.3	24.3	31.8	−82	+31
Commercial building	47.1	132.8	183.2	+182	+38
Mass housing	312.7	521.0	524.6	+67	+1
Unclassified	0.0	8.0	5.0	.....	−37
Backlog of proposed construction, December 31...	**$7,109.2**	**$7,452.3**	**$8,253.5**	**+5**	**+11**

* Includes private bridges: $4,000,000 in '51; $9,000,000 in '52; $0 in '53

New Fanny Mae

Bills indicate details on secondary mortgage plan

The Administration's plan for the Federal National Mortgage Assn. finally was outlined this month. Identical bills detailing Eisenhower's housing program were introduced in both houses of Congress (ENR Feb. 18, p. 41). Here's what they said about Fanny Mae:

It will be part of the Housing & Home Finance Agency, with the HHFA Administrator as chairman of a board of five government officials who will act as directors. The new Fanny Mae's initial capital funds would come from what apparently is about $70 million of existing capital and surplus. In addition, sellers of mortgage paper to Fanny Mae will be required to contribute additional capital—3% of the unpaid balances on the mortgages they sell to FNMA. As these funds come in, initial capital would be returned to the Treasury.

Fanny Mae is authorized to sell debt securities, not guaranteed by the government, to the investing public in an amount up to 10 times capital funds. At present the authorized amount would be about $700 million. If the securities proved difficult to sell, the Treasury might turn out to be the major buyer. It is authorized to buy $500 million of them, plus an amount equal to the reduction in Fanny Mae's present mortgage portfolio, but not over $1 billion.

• **Market support**—With this money, Fanny Mae would purchase FHA and VA mortgages (including participations in mortgages), but not more than $12,500 of unpaid balance per family unit. It could not make advance commitments, except under the one-for-one program. The bills provide that volume of purchases and sales, prices, and special charges would follow the policy that excessive use of FNMA should be discouraged.

It is possible that private investors might not want to buy the 40-year mortgages arising out of the proposed low-cost home ownership program and the mortgages financing urban redevelopment and rehabilitation. So

(Continued on page 58)

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the bill provides that the President may authorize the Treasury to supply funds for advance commitments and purchases to support special housing programs.

In return for FNMA debt obligations of not over five years maturity, the Treasury could supply funds for $200 million in purchases and commitments outstanding at any one time. The President could also permit $100 million in "participation agreements"—20% of each mortgage, with an agreement to purchase the rest from the private lender if the mortgage were defaulted. The President could also use this $300-million worth of purchasing authority to check a general decline in mortgage prices, such as occurred in the spring of 1953.

Pennsylvania Turnpike bonds are paid off far in advance

The revenue bonds sold to finance the 327-mi Pennsylvania Turnpike are being paid off six-and-a-half years ahead of schedule, according to the turnpike commission. If traffic continues at the current volume, bonds on the entire length of the present highway will be paid off by 1965. Originally they were scheduled to be retired by 1988.

Though 1953 figures are not complete, the commission expects that tolls and concession returns will run far ahead of the previous record of $20 million collected in 1952. Since 1940, when the original section of the toll road opened, about $90 million has been collected. Current traffic is now running about 12,000,000 vehicles a year, and concessions provide about $1.25 million in revenue.

That's why the commission expects to have no trouble selling another revenue bond issue to finance extensions, which will be started soon.

Business briefs . . .

• **Electric utility construction** in 1954 will be $3 billion, slightly more than in 1953. That's the estimate predicted by the Edison Electrical Institute, which is an industry fact-finding organization.

• **Gulf Oil Corp.** is building a new ethylene plant at Port Arthur, Tex., which it says will be the largest in the world. Ethylene is a basic material in a number of chemical compounds manufactured by the Gulf Coast's fast-expanding chemical industry. The plant will be built by Badger Process Division of Stone & Webster Engineering Corp.

Activity This Week

(In millions of dollars)
As reported to ENR

Amount of contracts let

	This Week*	Cumulative 8 wks 1954	Cumulative 8 wks 1953	Cumulative 8 wks % chge
Federal	$31.9	$149.7	$309.8	−52
State and municipal	78.7	573.3	665.5	−14
Total pub.	110.6	723.0	975.3	−26
Total priv.	115.1	809.9	1,611.5	−50
U. S. total	**$225.7**	**$1,532.9**	**$2,586.8**	**−41**
Contracts by type of work				
Waterworks	$2.5	$28.0	$32.9	−15
Sewerage	12.9	42.0	62.3	−33
Bridges	26.3	69.2	70.2	−1
Highways	15.6	172.2	175.1	−2
Earthwork, waterways	11.8	46.7	66.1	−29
Buildings:				
Public, excl. hsg.	21.6	215.6	276.9	−22
Housg., pub.	...	29.1	132.2	−78
Housg., priv.	61.4	406.0	674.2	−40
Commercial	21.1	159.9	139.8	+14
Industrial	25.9	212.6	692.9	−69
Unclassified	26.6	151.6	264.2	−43
Total	**$225.7**	**$1,532.9**	**$2,586.8**	**−41**

* 4-day week

NOTE: Minimum size projects included are: Waterworks and waterways, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000.

New capital for construction

(millions of dollars)	Week of Feb. 18 1954	Cumulative 7 Wks 1954	Cumulative 7 Wks 1953	Cumulative 7 Wks % chge 1953-54
Corporate securities	$38.3	$433.8		−18
State and municipal:				
Excluding housing	112.0	406.5		+1
Housing	2.8	13.4		−86
Federal loans	1.8	18.3		−12
Federal aid	...	...		...
Total non-federal	**$155.0**	**$872.1**		**−17**
Federal approp.:				
In U. S.	...	...		...
Outside U. S.	...	...		...
Total new capital	**$155.0**	**$872.1**		**−17**

ENR indexes		Base years = 100 1913	1926	1949
Constr. cost	Feb '54	614.71	295.49	128.86
	Jan '54	614.04	295.17	128.72
Bldg. cost	Feb '54	437.55	236.53	124.38
	Jan '54	436.88	236.16	124.19
Volume	Jan '53	338	137	98
	Dec '53	547	222	158

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $1.50 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record, 330 West 42nd Street, New York 36, N. Y.

Bids: March 16, 1954

Miscellaneous Alterations

THE PORT OF NEW YORK AUTHORITY
NEWARK AIRPORT
PASSENGER TERMINAL
CONTRACT NA-170.059

Sealed proposals for the performance of miscellaneous alterations in the Passenger Terminal at Newark Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, March 16, 1954, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112, and copies will be furnished upon deposit of $10.00 per set. The deposit shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to the Engineer of Materials who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than forty days after the opening of proposals. The deposit will be forfeited if the documents are not so returned within the forty days.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman

New York, February 25, 1954

U. S. Government

Bureau of Reclamation, North Platte River District—2154-P6, Casper, Wyoming. For Immediate Release February 1, 1954. UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION. NOTICE IS HEREBY GIVEN that sealed bids on Specifications No. 703C-329 for furnishing labor and materials and performing all work for Dry Spotted Tail Creek and Tub Springs Creek Diversion Dams, North Platte Project, Wyoming-Nebraska, will be mailed to P. O. Box 280, Casper, Wyoming or delivered to the office of the Bureau of Reclamation in time for the public opening at 10:30 a.m., Mountain Standard Time, March 2, 1954, at the office of the Bureau of Reclamation, Reclamation Center, Casper, Wyoming. Copies of the standard forms and of the specifications may be obtained from the following offices of the Bureau of Reclamation: R. J. Walter, Jr., Regional Director, Building No. 46, Denver Federal Center, Denver, Colorado; and I. J. Matthews, District Manager, P. O. Box 280, Casper, Wyoming. No charge for copies of the specifications furnished for bidding purposes; for all others $1.00 per copy, not returnable. Payments should be made by check or money order payable to the Treasurer of the United States. I. J. Matthews, District Manager.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4115) will be received at Coulee Dam, Washington, until March 23, 1954, for furnishing labor and materials for floor finishes and handrailings for Grand Coulee Pumping Plant, Power Plants, and Dam, Columbia Basin Project, Washington. Location: At Grand Coulee Dam, approximately 30 miles northeast of Odair, Washington. Principal items are: bonded concrete floor finish, lump sum; terrazzo floor finish, lump sum; excavation of 1500 sq. ft. of concrete floor slabs for floor finishes; installing aluminum handrailings, lump sum; furnishing and installing aluminum handrailings and steel handrailings, lump sum; furnishing and installing steel gratings and ceiling hatch, lump sum; and other work. Completion time 210 days. For particulars, address Bureau of Reclamation, Coulee Dam, Washington; or Building 53, Denver Federal Center, Denver, Colorado. W. A. Dexheimer, Commissioner.

Bids: March 11, 1954

Sidewalk and Curb Alterations

THE PORT OF NEW YORK AUTHORITY
HOLLAND TUNNEL
SOUTHWEST CORNER OF VESTRY AND VARICK STREETS
NEW YORK, N. Y.
CONTRACT O & M 216
PROPOSAL NO. 385

Sealed proposals for furnishing all labor, material and equipment necessary for sidewalk and curb alterations, southwest corner of Vestry and Varick Streets, New York, N. Y., will be received at the office of the Director of Purchase of the Port of New York Authority, Room 900, 111 8th Ave., New York 11, until 11:00 A.M. (E.S.T.) Thursday, March 11, 1954, at which time and place said proposals will be publicly opened and read.

Contract documents may be obtained upon request at the office of the Director of Purchase.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman

Bids: March 26, 1954

Construction of Superstructures

Sealed bids for construction of Contract 2, Superstructure, for the Albert Einstein College of Medicine of Yeshiva University will be accepted at the offices of Yeshiva University, 270 Park Avenue, at 2:00 P.M., Friday, March 26, 1954. The work involves General Construction, Sitework, Plumbing, Heating, Ventilating and Air Conditioning, Electrical Work and Elevators. Plans and Specifications will be available to bidders at the office of the Architects, Kelly & Gruzen, 80 Fifth Avenue, N.Y.C., on or about February 26, 1954. Cash or certified check for $100.00 per set of documents will be required, refundable to bidders only.

Yeshiva University

Bids: March 4, 1954

Contracts No. 204, No. 204A and No. 204B

MAINE TURNPIKE AUTHORITY
MAINE TURNPIKE
Section 2—Portland to Augusta
(Augusta Extension)

Sealed Proposals will be received by the Maine Turnpike Authority for:

GRADING AND DRAINAGE

at the offices of the Authority, 17 Bishop Street, Portland, Maine until 10:00 A.M., Eastern Standard Time, on March 4, 1954, at which time and place the Proposals will be publicly opened and read.

The work will be let either (a) under a single contract, Contract No. 204, which extends from north of High Street in the Town of Falmouth near Mile 51 to just north of Route 26 in the Town of Gray near Mile 62, or (b) under two separate contracts, Contract No. 204A which extends from north of High Street in the Town of Falmouth near Mile 51 to south of Blackstrap Road in the Town of Cumberland near Mile 56, and Contract No. 204B which extends from south of Blackstrap Road in the Town of Cumberland near Mile 56 to just north of Route 26 in the Town of Gray near Mile 62.

The principal items of work for Contracts No. 204A, 204B and 204 include:

	Contract No. 204A	Contract No. 204B	Contract No. 204
Clearing, Acres	52	102	154
Excavation Earth, Cubic Yards	800,000	550,000	1,350,000
Excavation Rock, Cubic Yards	3,200	86,800	90,000
Borrow, Cubic Yards	190,000	916,000	1,106,000
Pipe, Linear Feet	6,040	8,070	14,110
Inlets, Each	50	65	115
Concrete, Cubic Yards	80	560	640

Plans and Contract documents may be examined by prospective bidders during regular office hours at the offices of the Authority and at the offices of the Consulting Engineers, Howard, Needles, Tammen & Bergendoff, 55 Liberty Street, New York 5, N. Y. The plans and contract documents and sets of cross-sections for each Contract may be obtained from the Authority, 17 Bishop Street, Portland, Maine, upon payment of the following amounts for each set.

	Plans and Contract Documents	Cross-Sections
Contract No. 204	$35.00	$50.00
Contract No. 204A	$20.00	$30.00
Contract No. 204B	$20.00	$30.00

The contract documents and sets of cross-sections need not be returned, and payments will not be refunded. Checks shall be made payable to Howard, Needles, Tammen & Bergendoff.

Proposals must be accompanied by a certified or cashier's check payable to the Maine Turnpike Authority in an amount not less than five per cent (5%) of the Total Amount in the Proposal but not less than $500.00 nor more than $200,000.00.

If a bidder submits a Proposal for Contract 204, as well as a Proposal for Contract No. 204A and/or Contract No. 204B, one check based on the Total Amount in the Proposal for Contract No. 204 will be sufficient.

Proposals must be made upon the Proposal forms furnished separately by the Authority with the contract documents and must be enclosed in the sealed special addressed envelopes provided therefor bearing the name and address of the bidder and the number of the Contract on the outside.

Before the award of the Contract, any bidder may be required to show that he has the necessary facilities, experience, ability and financial resources to perform the work within the time required and to the satisfaction of the Authority.

The Bidder, to whom a Contract is awarded, will be required to furnish a Surety Corporation bond, satisfactory to the Authority, on the Standard Contract Bond form of the Authority, for a sum not less than the Total Amount of the Proposal.

The Authority reserves the unqualified right to reject all Proposals or to accept that Proposal which in its sole judgment will under all circumstances serve its best interests. The Contract will be awarded or Proposals rejected within thirty days after the date of opening Proposals, except that in the event of default by a successful bidder the Authority reserves the right to accept the Proposal of any other bidder within twenty days after such default.

MAINE TURNPIKE AUTHORITY
Paul C. Thurston, Vice-Chairman

February 11, 1954

CONTRACTORS
WATCH
THIS SECTION
for New Projects

Publish your announcements thru the "Proposal Section" of Engineering News-Record and get their bids.

OFFICIAL PROPOSALS

Bids: March 11, 1954

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 11th day of March 1954, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following project: in Ulster County, J. S. Bixby, Dist. Engr., Pleasant Valley Road, Poughkeepsie, N. Y.

Contract No.	Type	Name of Highway and Miles	Deposit for Plans	Bid Deposit	Dept. Estimate
C.T. 54-1	9" Cement Conc. Pavt. 61' Wide, Misc. Work	New York State Thruway-Catskill Section-Sub. 3 (Whiteport-Kingston, Pt. 1) 0.09 Mile	$10	$1,700	$31,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

The right is reserved to reject any or all bids.

B. D. TALLAMY
SUPT. OF PUBLIC WORKS

Bids: March 9, 1954

Pennsylvania Turnpike Commission Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed proposals will be received by the Pennsylvania Turnpike Commission, through the Chairman, 11 North Fourth Street, Harrisburg, Pennsylvania, until 10:00 a.m., Eastern Standard Time, the 9th day of March 1954, and immediately thereafter will be taken to the New House Caucus Room, 1st floor, Main Capitol Building, Harrisburg, Pennsylvania, and publicly opened and read aloud for the following contract:

For the construction of structures and the grading, drainage and paving of the Turnpike Section 37-D, part of the Northeastern Extension of the Pennsylvania Turnpike in Kidder Township, Carbon County, Commonwealth of Pennsylvania, this section being situated as follows:

Beginning at a point 108 feet northwest of the center line of L.R. 408, T.R. 940 at Turnpike Station 1254+65 in Kidder Township, Carbon County, thence in a northwesterly direction 19,157 feet to Turnpike Station 1446+22 at a point approximately 473 feet south of the Carbon-Luzerne County Line in the center of the Lehigh River, a distance of approximately 3.63 miles.

The approximate quantities of the principal items are as follows:

Class 1 Excavation	652,617 cubic yards
Class 2 Excavation	11,803 cubic yards
Borrow Excavation	296,866 cubic yards
Special Subgrade	145,019 square yards
Reinforced Concrete Pavement	82,950 square yards
Class A Concrete	575 cubic yards
Class B Concrete	32 cubic yards

Copies of plans, specifications and other contract documents, including cross-sections, are on file and open to public inspection at the offices of the Pennsylvania Turnpike Commission located at Harrisburg, Pennsylvania, not later than 22 February 1954. Plans, specifications, cross-sections, and other contract documents will be available by this date for inspection or for mailing to prospective bidders. Copies of Specifications for grading, drainage, paving and structures may be purchased from the Pennsylvania Turnpike Commission for the sum of five (5) dollars per copy. Copies of cross-sections may be purchased from the Pennsylvania Turnpike Commission for the sum of fifty (50.00) dollars per set.

Plans and contract documents, for this section, exclusive of cross-sections and specifications may be obtained from the Commission upon deposit of ten (10) dollars for each set, such deposits to be refunded in full to any actual bidder upon return of such documents in good condition within five (5) days after the date of the opening of the bids. Refund will be made for all plans, contract documents, and cross-sections returned, if the project is withdrawn from letting by the Pennsylvania Turnpike Commission.

Remittances are payable to the Pennsylvania Turnpike Commission and must accompany requests for drawings, specifications, contract documents, and cross-sections.

The character and amount of bid security to be furnished by the bidder is stated in the Instructions to Bidders.

The Commission reserves the right to waive any informalities in or to reject any or all bids.

No bids may be withdrawn for thirty (30) days after the scheduled closing time for receipt of bids.

PENNSYLVANIA
TURNPIKE COMMISSION
James F. Torrance
Secretary and Treasurer

Harrisburg, Pennsylvania
16 February 1954

Bids: March 29, 1954

Construction of Court House

BIDS RECEIVED
COUNTY OF MONMOUTH
STATE OF NEW JERSEY

NOTICE IS HEREBY GIVEN that sealed bids will be received by the Board of Chosen Freeholders of the County of Monmouth for the construction of the proposed New County Court House and said bids will be opened in public at a regularly adjourned meeting of the said Board to be held at the meeting room of said Board at the present Court House in the Borough of Freehold, County of Monmouth, on Monday, March 29th, 1954 at 11:00 a.m.

Separate bids will be received for each of the following:

Contract #1—General Construction
Contract #2—Structural Steel, Miscellaneous and Ornamental Metals.
Contract #3—Plumbing and all kindred Work.
Contract #4—Heating, Ventilating, and Air Conditioning.
Contract #5—Electrical

Complete specifications and plans including a copy of the standard proposal form and form of bid, are on file with the architect of the Board of Chosen Freeholders, James W. Mancuso, at his office at 9 Memorial Parkway, Long Branch, New Jersey, and copies of the same may be received by prospective bidders upon application to the said Architect.

One set of documents may be obtained from the Architect by depositing $50.00 with him for such set of documents. The amount of $50.00 will be refunded to Contractors who returned the Documents in good condition within ten days after the opening of the bids. Contractors desiring more than one set shall pay $50.00 per additional set. This amount, for additional sets, not refundable.

Bids must be made on standard proposal forms in the manner designated therein and as required by the specifications must be enclosed in sealed envelopes bearing the name and address of the bidder, designating the name of the work on the outside, addressed to the Board of Chosen Freeholders and must be accompanied by a certified check drawn to the order of the County Treasurer for not less than 10 per cent of the amount bid but not to exceed $20,000.00.

The lowest bidder, if awarded the contract, must furnish a bond in the amount of the contract price as provided by statute for the faithful performance of all the provisions of the specifications and contract relating to the construction of the work, said bond to be furnished at the time of the signing of the contract. The bid must be accompanied by a certificate from a responsible surety company authorized to do business in the State of New Jersey, which certificate shall be properly executed by an executive officer of said company authorized for that purpose,which said certificate shall state that the surety company will provide the bidder with the bond above mentioned in the amount of the contract price if the contract is awarded to said bidder.

The said bid together with the certified check and certificate from the surety company as above provided, shall be delivered at the place and at the hour above mentioned.

Right is reserved to reject any and all bids if deemed to the interest of the Board of Chosen Freeholders of the County of Monmouth to do so.

By Order of the Board of Chosen Freeholders of the County of Monmouth.

JOSEPH C. IRWIN
DIRECTOR

Dated: February 9, 1954
Attest: Edward C. Broege
Clerk of the Board

Bids: March 16, 1954

Construction of In-Transit and Warehouse Building

The Board of Harbor Commissioners, Marine Terminal, Wilmington, Delaware, invites sealed proposals for the construction of a new In-Transit and Warehouse Building, Wharf, Grading, Water Supply, Fire Protection, Railroads, Paving and Electric Work, on 16 March 1954. Bids will be publically opened and read at the office of the Marine Terminal at 2.00 P.M., E.S.T., on the above date. Bidders may mail their bids to the Board of Harbor Commissioners, P. O. Box 1191, Wilmington, Delaware.

Harris-Dechant Associates, Consulting Engineers, 123 S. Broad Street, Philadelphia 9, Pennsylvania.

Plans, Specifications and proposal forms may be secured from the Board of Harbor Commissioners, Wilmington, Delaware by depositing $30.00 per set, which deposit will be refunded only upon the receipt of a bona fide bid, and return of the plans and specifications in good order within ten (10) days after the opening of bids; otherwise the deposit will be forfeited.

Plans and specifications may be reviewed free of charge at the Offices of the Engineers.

Each proposal must be accompanied by a certified check drawn to the order of the Board of Harbor Commissioners, or a Proposal Guaranty Bond in the amount of $25,000.

The Board reserves the right to reject any or all bids, and to accept or reject any part of any bid.

Proposals may be submitted on the separate Proposal Forms provided, but shall not be submitted on bidders letterheads.

BOARD OF HARBOR COMMISSIONERS
WILMINGTON, DELAWARE
JOSEPH S. WILSON,
President

15 February 1954

Read the Official Proposal Columns of ENGINEERING NEWS-RECORD This Week and Every Week

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The advertising rate is $17.10 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

Send NEW ADVERTISEMENTS: To New York Office, 330 W. 42nd St., N. Y. 36 for March 11th issue closing March 1st.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

BUILDING ESTIMATOR and Quality Take-Off Man. Graduate Engineer preferred. Thoroughly experienced, permanent position with well established contractor with top-notch organization bidding competitively public works and commercial buildings throughout the South. Stanley W. Newman Company, Inc., P. O. Box 1646, Mobile, Alabama.

STRUCTURAL STEEL Detail Draftsmen and Checkers. All types of Structures. Interested in only top quality men with five or more years highly successful experience. Send complete written information for investigational purposes. Bristol Steel and Iron Works, Inc., Bristol, Virginia-Tennessee.

WANTED—MAINTENANCE & Survey Superintendent for upstate N. Y. equipment fleet. Consists of 35 trucks (tractors, dumps, service units); 55 trailers (flats, vans, tanks, dumps) shovels, rollers, bulldozers and allied equipment. Must be capable of taking full charge of Maintenance & Service Department housed in well-equipped shop with 12-man crew. Should know Diesel engines. Prefer man with some crushing plant or similar experience. Excellent chance for man big enough to grow with well-established, expanding organization. Housing available. P-1648, Engineering News-Record.

BUILDING ESTIMATOR — Graduate Engineer preferred. Must be thoroughly experienced in bidding and constructing of Sewer Disposal Plants. Well established Construction Company, bidding throughout Southeast. Wright Contracting Company, P. O. Box 1580, Columbus, Georgia.

ESTIMATOR AND Sales in Virginia on salary base with at least 15 years experience primarily in take-off, pricing and selling in structural and ornamental shop employing 80 men. Permanent position with progressive company. Applicant must have been similarly employed. State experience in detail. P-1549, Engineering News-Record.

WANTED: STRUCTURAL steel designer. Must be experienced in design of highway bridges and under 50 years of age. Submit brief outline of experience and state minimum starting salary acceptable. Address reply to the Bridge Division, Tennessee Department of Highways, Cotton States Building, Nashville, Tennessee.

WELL ESTABLISHED detailing concern — N. Y. C., Phila., area—needs fast accurate steel detailers, checkers. Usual privileges. Salary plus cash profit sharing every job. Give complete experience resume. P-1497, Engineering News-Record.

WANTED: CONSTRUCTION Superintendent by March 15 for work in New England, with experience in industrial type buildings and Government projects. Must be capable of taking complete charge of work, including concrete and masonry. Send full record of education, past experience, references, and salary expected. P-1545, Engineering News-Record.

SEWERAGE DEPARTMENT Superintendent—Take charge of primary treatment plant and maintenance of sewerage system. Experience required. Salary $400 per month. Submit age, experience and references. Write City Engineer, South Milwaukee, Wisconsin.

ESTIMATOR WANTED—by General Contractor. Applicant to have experience in estimating all types of building construction. Salary commensurate with experience and ability. Reply to Post Office Box 664, Birmingham, Alabama.

BRIDGE DESIGNERS and draftsmen wanted. State education, experience, and salary desired in reply. T. B. Gunter, Jr., Bridge Engineer, State Highway and Public Works Commission, Raleigh, North Carolina.

CHIEF DRAFTSMAN

To assume complete responsibility of Drafting Room for Southwestern steel fabricator, supervising 20 to 30 workmen. In reply give full education, experience, background, age and salary expected.

P-1688, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

Concrete Engineer

Challenging position available for engineer graduate, 28 to 45, interested and experienced in Laboratory and field research and development concerned with concrete pavements. Salary open. Chicago Suburban location.

P-1735, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

POSITIONS VACANT

SUPERINTENDENT LARGE bridge project in South. Prefer graduate 35-45 with heavy experience cofferdams, piledriving, floating equipment, structural steel erection, concrete, etc. Progressive firm adding to expanding supervisory staff. Submit complete details including age, education, experience, references, availability, salary expected. P-1750, Engineering News-Record.

EXPERIENCED ENGINEER for well known General Construction office in Northern New Jersey. Prefer young man who can expedite Jobs and purchase. Replies will be held confidential. Good salary, excellent opportunity. P-1747, Engineering News-Record.

PAVING AND Grading superintendent, bridge superintendent. Unusual permanent opportunity for top qualified superintendents with one of Ohio's most aggressive and best equipped Highway and Industrial contractors. Experience must include actual detailed direction and layout of all phases, with history showing unusual aggressiveness, practical new ideas, ability to organize and meet construction and cost schedules. C.E. training desirable. Mail personnel record with recent photo if available, to P-1746, Engineering News-Record, 520 North Michigan Avenue, Chicago 11, Illinois.

COLORADO WANTS—Structural & Mechanical Engineers, Structural Steel Detailers Draftsmen—Hvy architectural Steel/Concrete Designers. Send histories (no registration fee) Good Employment Agency, 1554 California St., Denver, Skilled Service by Grad. Engineers.

SALES ENGINEER under 35 to work with Paper Mill executives for sales and service of well known paper mill equipment. Mill experience preferred;—technical training essential. Applications treated as confidential. Reply giving personal history and experience. P-1765, Engineering News-Record.

PRIVATE UTILITY in So. Calif. desires young graduate civil engineer capable of advancing in later years to an executive position. Work principally involves design, field investigation and eventual supervision of construction and maintenance projects on hydro electric facilities such as dams, flowlines, penstocks, etc. State salary requirements in detailed letter of experience and scholastic background. P-1800, Engineering News-Record.

CONSTRUCTION FOREMAN sewer systems etc., must have heavy experience and be available at present in New Jersey. P-1801, Engineering News-Record.

MECHANICAL ENGINEER for supervision of hospital project—Washington, DC vicinity. M.E. Degree or MASME preferred. Experienced in supervision, coordinating, estimating of plumbing, air conditioning and/or installations. State experience, salary earned, references. P-1814, Engineering News-Record.

GRAVEL PLANT Superintendent for portable and stationary plant in Michigan and Indiana. State exact experience and wages. P-1819, Engineering News-Record.

(Continued on the following page)

WANTED
CIVIL ENGINEERS

3 @ Starting Salary $5100 per year, with pension and hospitalization plans, two weeks vacation. B.S. Degree required in College of Civil Engineering, with a minimum of four years experience in Highway or Municipal Engineering balanced between design office, field construction and survey work. Location Chicago Area.

2 @ Starting Salary $4320 per year, with pension and hospitalization plans, two weeks vacation. B.S. Degree in College of Civil Engineering desirable but not required; recent or February or June, 1954, graduates preferred; otherwise applicants must have high-school education and not less than four years experience in Civil Engineering work including drafting. Location Chicago Area.

P-1804, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

WANTED
CIVIL ENGINEERING GRADUATES FOR TURNPIKE WORK IN THE MIDDLE WEST

With experience in the following classifications.

SURVEYORS, STRUCTURAL DESIGNERS MATERIAL and SOILS ENGINEERS INSPECTORS.

Mail experience record with salary required to:

HAZELET & ERDAL
53 W. Jackson Blvd. Chicago 4, Ill.

BRIDGE ENGINEERS

Recent Civil Graduate of accredited U.S. colleges. Should have not less than the following experience on bridges:

Detailers—2 years structural steel or reinforced concrete detailing.

Designers—5 years responsible work on structural steel and concrete including work on long span bridges.

Squad Leaders—3 years responsible charge of squad on structural steel detailing.

Please mail complete resume together with salary required to:

Howard, Needles, Tammen & Bergendoff
55 Liberty Street New York 5, N. Y.

WANTED
CHIEF ENGINEER

to represent Consultant on Large Turnpike Project in Mid West. Permanent Opportunity.

P-1774, Engineering News-Record
330 W. 42nd Street, New York 36, N. Y.

POSITIONS VACANT
(Continued from preceding page)

CONSTRUCTION SUPERINTENDENT Wanted. Small but old, well-known general construction firm in Albany area desires to negotiate mutually profitable agreement with a thoroughly qualified all-around construction superintendent who is also good at keeping records, estimating, expediting, etc. Must be between 30 and 40 years old and a graduate civil engineer is preferred. Write box P-1806, Engineering News-Record.

SELLING OPPORTUNITY OFFERED

SALES ENGINEER—Pittsburgh, Pennsylvania and Albany, New York territories open with established national concern selling prefabricated metal products to engineering and construction markets. Positions offered are permanent and present excellent future with aggressive, progressive and expanding organization. Engineering degree desirable. Previous sales experience unnecessary. Age 24 to 30. Car furnished. Complete training program. Salary and bonus. RW-1420, Engineering News-Record.

EMPLOYMENT SERVICE

OVERSEAS CONSTRUCTORS — Digest Guide of most active construction-engineering firms, oil co's., UN & gov't agencies now hiring for foreign projects. Send $1.00. Cove-McKane Int., P. O. Box 126-E, NY 4, NY.

POSITIONS WANTED

SURETIES — CONTRACTORS — Architects — Owners: If your construction project needs speeding-up — coordinating — reorganizing, or taken over and managed with present personnel, or if you just need a lift, I probably can help you. 35 years Construction management and organizational work. Best of references from banks, sureties, contractors and architects. Inquiries invited B. F. Bleuer, 116-Mona Drive, Buffalo 15, N. Y.

ATTORNEY-CIVIL Engineer—29—8 years experience as a Civil Engineer desires position with engineering organization, contractor, law firm or corporation where combination of engineering and legal knowledge will be utilized. New York area. PW-1614, Engineering News-Record.

STRUCTURAL ENGINEER: over 25 years experience in structural steel and reinforced concrete. In charge of medium sized engineering organizations for last 15 years. Technical graduate. PW-1610, Engineering News-Record.

TUNNEL CONSTRUCTION Superintendent—20 years wide experience driving and concrete lining, excellent following. Available March first. Complete resume on inquiry. PW-1644, Engineering News-Record.

CONSTRUCTION ENGINEER—C.E. graduate with 25 years successful experience supervisory capacity both field and office. Sound knowledge all phases general construction and some industrial chemical. Seeking connection where top man required. PW-1397, Engineering News-Record.

GOOD MAN seeking better job. Civil Engineer, 31. New York Registr. General Contractors Estimator-Supt. Heavy concrete experience, large projects. Know field costs. New York, Westchester, Long Island vic. Reply PW-1737, Engineering News-Record.

STRUCTURAL ENGINEER, registered, 28 years subways, waterfronts, buildings, power and chemical plants, available for responsible position anywhere. PW-1720, Engineering News-Record.

ENGINEER & FOR. Ser. Grad. Matr'l testing, heavy cons't. Specialty soils & asphalt. 28 yrs. single, passport. 3 o'seas contracts, French & German W/ some Spanish & Arabic, domestic or foreign. PW-1717, Engineering News-Record.

STRUCTURAL ENGINEER, registered, 28 years subways, waterfronts, buildings, power and chemical plants, desires part time work. PW-1721, Engineering News-Record.

CONSTRUCTION EXECUTIVE with broad experience seeks new connection as Project Manager or similar position where high grade man is required to handle all details of contracting, field and office, buildings and heavy construction. New York or vicinity. PW-1749, Engineering News-Record.

ACCOUNTANT AUDITOR — Desires foreign situation. 18 years diversified foreign and stateside experience in all phases of government and private construction accounting. Now employed. Available April 1st. PW-1763, Engineering News-Record.

PLANT LAYOUT Engineer-Draftsman, 30:—Experienced designer industrial piping, processing equip't., Material Handling & other Mechanical Installations, can relocate. Address PW-1769, Engineering News-Record.

ESTIMATOR, COST Engineer in heavy construction. 2 years field, five years office; Experience — excavation, concrete, foundation work. Have done estimating, cost analysis, expediting & purchasing. N.Y.C., L.I., Westchester County. CE Grad 32. PW-1817, Engineering News-Record.

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ARCHITECTURAL ENGINEERING
OUR COURSES of instruction by mail HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations. Forty-fourth year. Write today.
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Learn latest methods to organize and run work. Prepare for the top jobs.
Send post card for details.
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Complete Building Estimators Course, also Building Labor Calculator for practicing estimators. Thirty-fourth year serving the building industry. For free trial and all particulars write:
TAMBLYN SYSTEM
1420 Gilpin St. Denver 6, Colorado

POSITIONS WANTED

GENERAL SUPERINTENDENT, 25 years diversified experience including industrial plant construction, heavy excavation soil and rock, docks and piers, concrete structures, highways, bridges, dams, sewer systems and treatment plants, water systems and pumping stations. Capable of assuming full responsibility on large job. Good background, know men and equipment. Good references, available any location immediately. PW-1764, Engineering News-Record.

CIVIL ENG. Struct. Steel Draft. Exp. Seeks Situation. PW-1748, Engineering News-Record.

CIVIL ENGINEER 15 years experience. Specialist steel erection, general heavy construction background, desires locate deep south with contractor. Handle all aspects, including contracting, engineering and field supervision. PW-1796, Engineering News-Record.

PROJECT MANAGER, construction superintendent or engineer (graduate), 28 years experience heavy construction, industrial buildings, machinery. PW-1799, Engineering News-Record.

BUSINESS OPPORTUNITIES

Experience Civil and Structural engineer interested buying or associating with established high-grade practise. BO-1707, Engineering News-Record.

American licensed British Manufacturer of earth moving and other industrial equipment is expanding into new development territory and wishes to hear from all aggressive U. S. companies who are interested in the distribution, or the ultimate licensed manufacture of their product within the sterling area. All replies received in confidence, and first class American references gladly supplied. Cheshire Engineering Co., 19, Berkeley Street, London, W.1., England.

Lady having inherited a large industrial establishment, (about 100 modern machines) situated in Paris suburb, having to do with manufacture of precision equipment, is looking for associate. Write Havas No. 348/598, rue Vivienne 17, Paris, who will forward.

Wanted a party who has a Portable Crusher to join with us in the production of crushed Stone. In a good Metropolitan Area, that has a potential Market of 500,000 tons, this coming year. BO-1809, Engineering News-Record.

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Structural and Plate Steel Fabricators
Open capacity for quick delivery now available. We solicit your inquiries for Steel Fabrication and Warehouse Steel Products. Let us figure your jobs . . . Large or Small.
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STRUCTURAL STEEL
Made and Checked by Experienced Men
PEERLESS DRAFTING AND SALES CO.
1320 Grandin Rd. S.W. Roanoke, Va.

WANTED ONE (1) HOT MIX BLACK TOP PLANT
State age, size and price.
Reply to:
JAMES JULIAN, INC.
405 S. DuPont Road Elsmere, Delaware

WANTED TO BUY
1—DUST COLLECTOR for an Asphalt Plant
HIGHWAY PAVING COMPANY
Box 487 Coplay, Lehigh County, Pa.

FOR SALE
D-7 CATERPILLAR TRACTOR
with Isaacson Dozer Blade
Hyster Winch, and Steel Canopy
Steam cleaned and painted, recent overhaul
$7,500 F.O.B. Coquille, Oregon
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or
Salvage Dept., 100 Broadway, N.Y. 5, N.Y.

STEEL FORMS
For Sale Immediately
Six sets, in and out, of Circular Irvington Steel Forms. Each being 15' wide and 35' high. Made for concrete tank 128' inside diameter and 35' high. Forms can be dismantled and used as wall forms giving approximately 6300 square feet of formed surface. All steel waters and bracing included—approximately 86 tons. $10,000 for immediate sale as assembled. F. O. B. Detroit.
J. R. AZOLA COMPANY, Inc.
Contractors
18120 James Couzens Detroit 35, Mich.
Phone: University 4-1417

DW21
s/n 8W182
DEMONSTRATOR
Only 652 hours. Just made completely current with factory modifications. Guaranteed A-1 in every way. Inspect this one at our yard. Excellent buy at
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70 CFM Smith (GAS) Portable
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105 CFM Worth-IR-CPT Portable
107 CFM 7-7 x 7 Ingersoll FS-1 STEAM
129 CFM 7½ x 7 American AF-1, 20 HP
142 CFM Ingersoll Semi-Portable 25 HP
160 CFM IR-Worth Portable
165 CFM Smith 110SR Semi-Portable, 25 HP
195 CFM 8-9 x 9 Worthington HS STEAM
210 CFM Worthington (GAS or DIESEL) Port
211 CFM 9 x 9 Worthington HB, 40 HP Elec
279 CFM 11-10 x 11 Worthington HS STEAM
294 CFM 10 x 12 Worthington HB, 50 HP
315 CFM Worthington (GAS or DIESEL) Port
387 CFM Gardner Semi-Portable 75 HP
445 CFM Gardner Semi-Portable 100 HP
462 CFM 12-14½ x 13 American AF-5 STEAM
500 CFM Worthington (DIESEL) Portable
538 CFM Worthington Semi-Portable, 100 HP
600 CFM Worthington (DIESEL) Portable
628 CFM 14 x 13 Ingersoll ES-1, 100 HP

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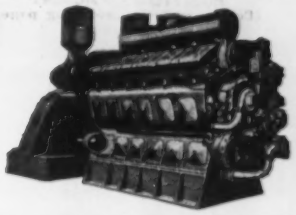

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1136	Fairbanks Morse	38D	1600	720	300	General Motors	8-268A	450	1200
1100	General Motors	16-278A	1600	720	200	General Motors	8-268A	350	900
750	General Motors	12-567	1080	720	150	Worthington	CC-4	225	450
500	Baldwin	VO-8	750	514	150	Ingersoll-Rand	8-4	225	600
500	General Motors	8-278A	750	720	150	Buckeye	80	240	600
500	General Motors	8-567	720	720	100	Worthington	BB-5	150	600
480	Worthington	DD-8	700	360	100	General Motors	3-268A	150	1200
400	Ingersoll-Rand	8-8	600	720	60	General Motors	6-71	90	1200
350	Baldwin	VO-6	510	450	30	Internat'l Harvester	UD-14	45	1200

A. G. SCHOONMAKER COMPANY, INC.

ENGINE DIVISION, 50 CHURCH ST., NEW YORK 7, N. Y.

FOR SALE

Located in our Yard, Cleveland, Ohio, in excellent condition subject to prior sale:

6—25 YD. R. U. LeTOURNEAU SCRAPERS, overhauled, tires good, Serials S9062, S9519, S9643, S9656, S8991, S8992, $4500.00 each.

1—MODEL 9 BV EUCLID LOADER, Serial 9 BV-121, powered with GMC Diesel 671 RA 63-6A-9046, completely overhauled and good as new. Has new belt never used. Price $18,000.00.

1—6 TON BROOKVILLE DIESEL LOCOMOTIVE 36" gauge, International UD9 Engine 5 speed transmission, 20" rolled steel wheels, mechanical brakes, gas starting engine, electric lights, enclosed cab, used 3 months, price $1500.00.

Call Mr. Fuller Grund, Broadway 1-7860

THE HUNKIN-CONKEY CONSTRUCTION COMPANY

3459 E. 52nd Place **Cleveland, Ohio**

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1—2 cubic yard Lima Combination Crane and Shovel with 100 foot boom plus 25 foot jib.

1—1½ cubic yard Northwest Crane.

Subject to prior sale

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Grahamsville 2861

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Manitowoc Diesel Powered Speedcranes for rent. 25, 40 and 60 ton capacities with booms 100' or more, 20' and 30' jibs. Special price on long rentals.

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Tel. STillwell 4-1030

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1¼ yd Manitowoc 3000A diesel cranes 65' boom. Cat. D13000 engine.
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44 ton GE Diesel-Elec. Loco. new 1951.
25 ton GE Diesel-Elec. Loco. new 1950.
30 yd Western & Koppel Air Dump Cars.
25 ton Wiley Steel Stiffleg Derrick.
1200 CFM Ing. Rand XRE, 200 HP Air Compr.
130 HP Christian 2D Diesel Hoist.
60 ton Clyde Elec. Revolver or Gantry.

MISSISSIPPI VALLEY EQUIPMENT CO.
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SHOVEL BARGAIN

MANITOWOC Model 3500 Stripper

35' Boom, 27' Sticks, 2½ Yd. Dipper
Cummins Diesel Engine, Torcon Drive
Machine new 1951. Excellent Condition.
PRICE, F.O.B. Cars.....$37,500.00

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Phone: LEhigh 1-6020

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LOCOMOTIVES

1½ to 10 Ton — 18" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Penna.

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Rebuilt—A1 Condition

1 48B Bucyrus Erie Shovel 2 cy diesel
1 Model 6 N.W. Shovel 1½ cy diesel
1 Caterpillar D8 Bulldozer
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20"	5	1/8"	1/32"	28 Oz.
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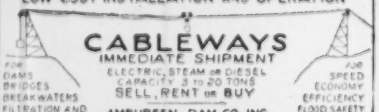

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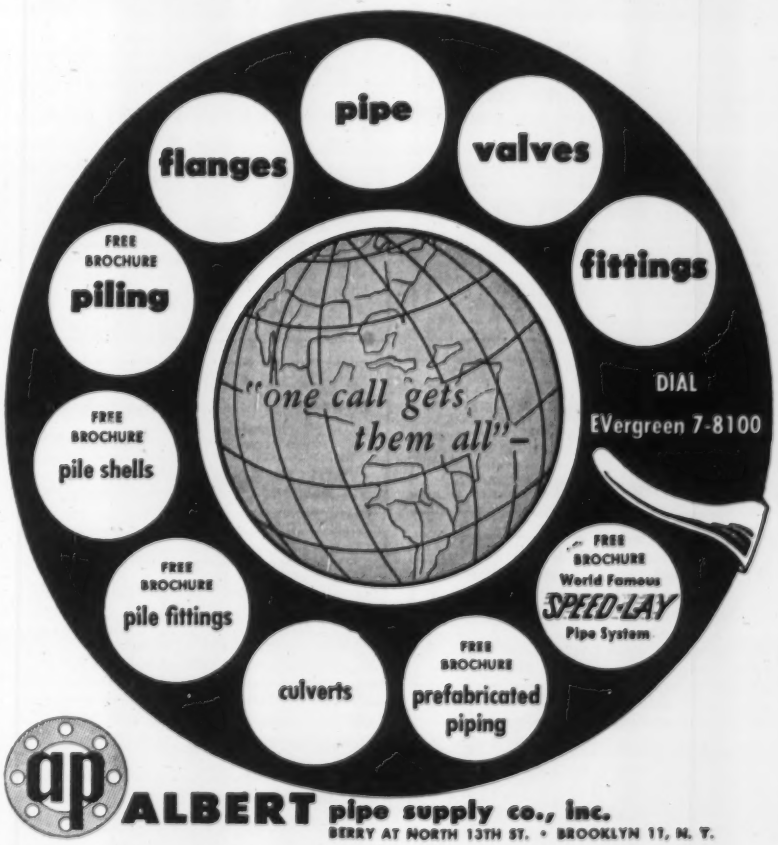

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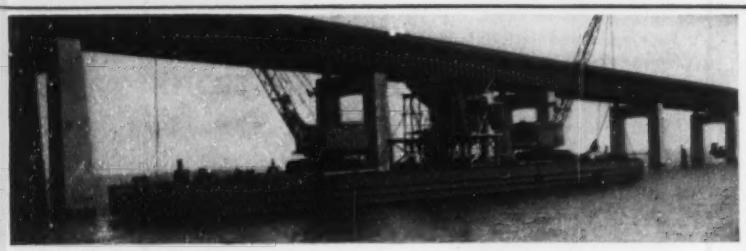

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Diamond and Shot Core Borings
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11" BUILDERS' LEVEL
31/2" Horizontal Circle. 20X. Coated Lens. Complete with fixed leg tripod and carrying case $125.00

Write for Descriptive Literature
Inquire about other Engineering Instruments
UNION MERCANTILE CO.
465 California Street San Francisco, Calif.

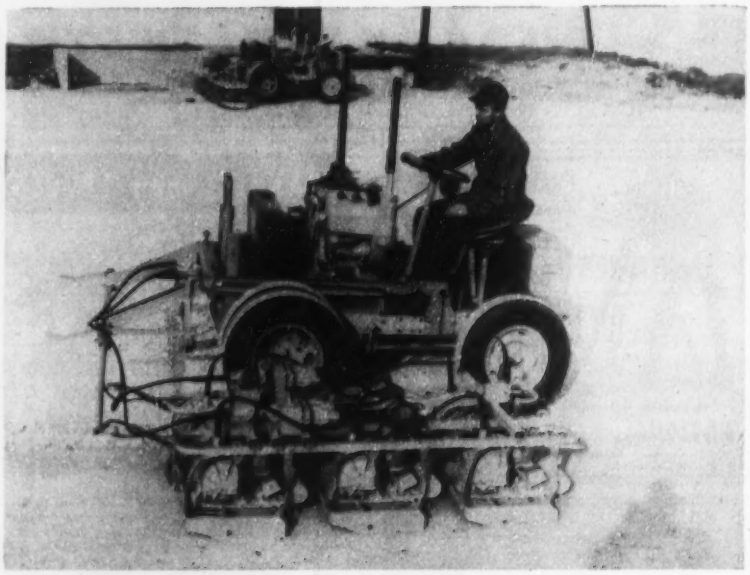
NEW PRODUCTS

Grader elevator moves 1,200 yd per hr

A new elevator attachment is now available for Allis-Chalmers 78-bhp AD-30 and 104-bhp AD-40 motor graders, and it can also be mounted on the two preceding models, the AD-3 and AD-4. Capacities range up to 1,200 cu yds per hr, depending on soil and ground conditions.

The main frame, including the box-type plow beam, is a single unit that is mounted at three points on the grader. The plow beam is adjustable for different positions of the plow disk while the 30-in. disk is also adjustable for wear.

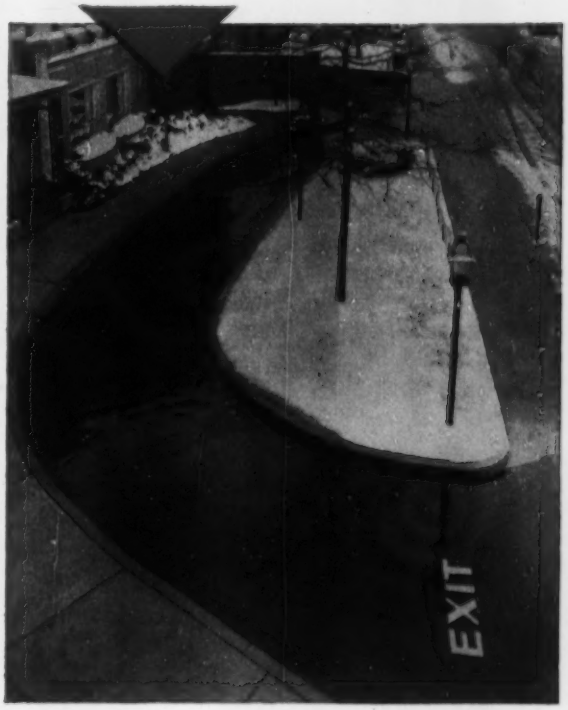
(*Continued on page 71*)



Widening tamper has one-pass feature

A new frame assembly has been designed so that vibrating tamping shoes may be side-mounted for flexible base-course widening operations. In this application the six vibratory compaction units—normally mounted ahead of the tractor for standard road construction—are assembled in tandem and towed over the widening strip. It is reported that with three compactors in tandem (single or double row), complete compaction is achieved in one pass. The compactor units are available in a standard 26-in. width or in any width down to 12 in. according to specification. Jackson Vibrators, Inc., Ludington, Mich.

The advantages of WROUGHT IRON PIPE for snow melting systems start with installation and continue in service



It isn't unusual at all for designers to divide the advantages of wrought iron pipe for snow melting into *installation* advantages and *service* advantages. We call them the "before-and-after" advantages of wrought iron, but regardless of title, they are mighty essential to that all-important goal—ECONOMY.

Let's take a look at what wrought iron pipe means to economy during installation. It's easily formed and welded, on the job, with standard equipment. No special techniques, no extra tools are needed for a fast, dependable job. Wrought iron pipe bends true, and is free from annoying "spring-back." This feature eliminates strain on connected equipment and speeds work. In welding or threading operations, wrought iron's uniform structure pays off in sound welds; sharp, full-depth threads, all accomplished in minimum time. Essential, too, is wrought iron pipe's strength. Users report that it has what it takes to withstand mechanical damage and doesn't require the "kid-glove" treatment.

Wrought iron pipe's superior "in service" reputation is built around three big points. First, its ability to resist corrosion, serve longer at lower cost per year, is providing satisfactory, economical operation in hundreds of snow melting installations. Second, wrought iron pipe's high rate of heat emission means maximum snow melting efficiency. Third, wrought iron pipe's coefficient of expansion, virtually identical to concrete over wide temperature ranges, bans the danger of thermal cracks, and loss of bond.

There is, of course, more to the wrought iron pipe snow melting story. Our bulletin, *Wrought Iron Pipe for Snow Melting Systems,* gives complete details. Write for your copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Dept.: New York, N.Y.

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CORROSION COSTS YOU MORE THAN WROUGHT IRON

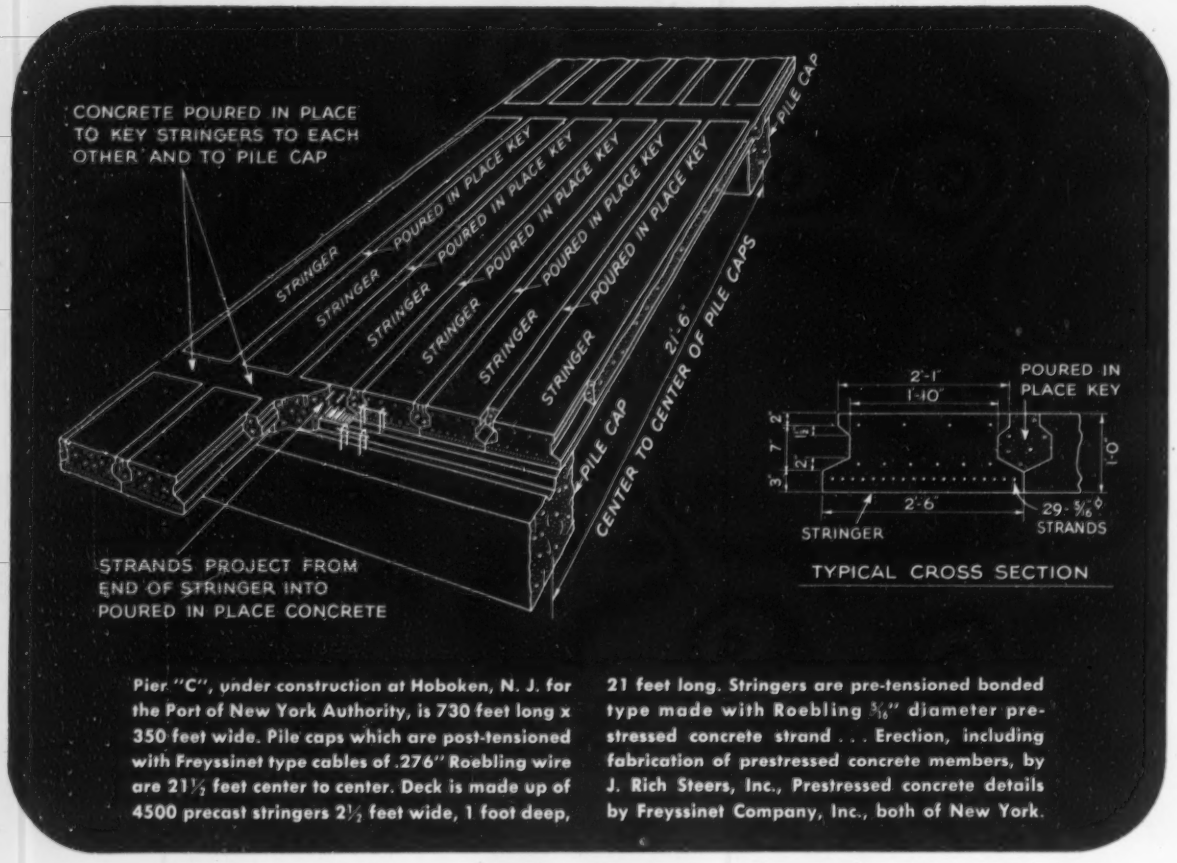
WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

FOR DEPENDABLE TENSIONING OF PRESTRESSED CONCRETE MEMBERS . . .

ROEBLING WIRE AND STRAND



Pier "C", under construction at Hoboken, N. J. for the Port of New York Authority, is 730 feet long x 350 feet wide. Pile caps which are post-tensioned with Freyssinet type cables of .276" Roebling wire are 21½ feet center to center. Deck is made up of 4500 precast stringers 2½ feet wide, 1 foot deep, 21 feet long. Stringers are pre-tensioned bonded type made with Roebling 3/16" diameter prestressed concrete strand . . . Erection, including fabrication of prestressed concrete members, by J. Rich Steers, Inc., Prestressed concrete details by Freyssinet Company, Inc., both of New York.

IN PRE-TENSIONING, where wire or strand is prestressed between anchorages before the concrete is cast, the prestress is transferred to the concrete through bonding action. For this reason, Roebling high tensile steel wire and strand are so processed as to afford maximum bonding characteristics . . . and this, combined with superior strength, has put Roebling tensioning elements way out front in the rapidly-growing swing to prestressed concrete.

Roebling materials for pre-tensioning were developed to facilitate the fabrication of prestressed concrete members on a standard production basis. This involves fabrication at a central plant where quality and labor practices can be controlled, and costs held to a minimum. Then, as with the Hoboken pier, (illustrated here), the finished members are carried to the construction site and erected directly from the truck.

Roebling engineers are always ready to study the designs of prestressed concrete structures and to offer suggestions as to the best tensioning elements for specific applications. John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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The 42-in. conveyor belt is driven by a power take-off that is directly connected to the engine drive shaft through V-belt sheaves to the clutch.

Length of the conveyor is 19 ft, with a 3-ft extension available as an extra. The conveyor also can be shortened to 16 ft by removing a 3-ft length. For transit, the conveyor is hinged to fold into a vertical position at the center.

Controls for operating the plow beam and raising or lowering the conveyor at the drive roller end, tail roller end and at the hinged center are mounted conveniently for the operator.

A two-way spiral cleaner carries dirt out both sides and is driven by the conveyor belt to eliminate transmission complexity. A V-type cleaner has been included to keep dirt from between the belt.

Sold exclusively through Allis-Chalmers dealers the attachment is manufactured by the HANCOCK MFG. CO., LUBBOCK, TEX.

Treatment extends form life 80 per cent for 1¢ psf

With the thought that reusability is a major factor in cutting concrete forming costs, a Georgia manufacturer offers a hard-surfaced form coating. Called Form-Lac, the material can be sprayed or brushed on plywood forms at a cost of about 1¢ per sq ft. This done, it is said that the forms last 70% to 80% longer while giving a smoother finished job.

Added advantages claimed for the sealer and preservative include faster stripping, minimized cleanup afterward and near elimination of concrete patching that would result from stuck forms.

Form-Lac and Form-Lac Thinner are available in 55, 5 and 1-gal containers. MAXWELL HITCHCOCK CO., 191 SIMPSON ST., N.W., ATLANTA, GA.

Compact, 318-hp diesel features turbo-supercharger

Hercules Motors is now producing a turbo-supercharged variety of the 6-cyl Model DFXE diesel. The new engine is designated DFXE-Ts and has a 5⅜-in. bore and a 6-in. stroke for a total of 895-cu in. displacement. The DFXE-Ts develops 846 lb-ft torque at 1,800 rpm and 318 hp at 2,000 rpm.

The new engine is designed to replace the non-supercharged type in applications requiring additional horse-

(Continued on page 72)

Don't wait... the weather won't!

STOP RUST! with RUST-OLEUM

Protect your unsheltered equipment

Consider the money you have tied up in equipment that must operate in rain, snow, sleet, hail, fumes, heat, etc. You need RUST-OLEUM's tough, elastic coating to protect your draglines, machinery, tractors, dump-trucks, bridges, culverts, and every rustable metal surface! Applied over rusted surfaces . . . RUST-OLEUM *lasts longer*. Just wirebrush and scrape to remove rust scale and loose particles, as well as dust, grease, and oil . . . then apply RUST-OLEUM by brush, dip, or spray directly over remaining rust.

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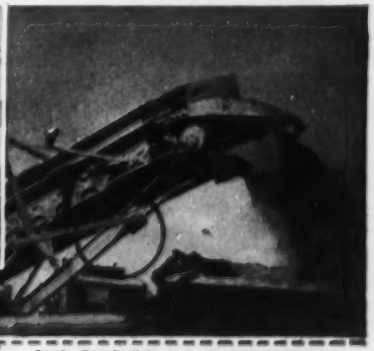
Use RUST-OLEUM's protective coating to brighten up your equipment—match original colors—keep it looking in top shape! Write for complete literature, *today*. Prompt delivery from Industrial Distributors in all principal cities.



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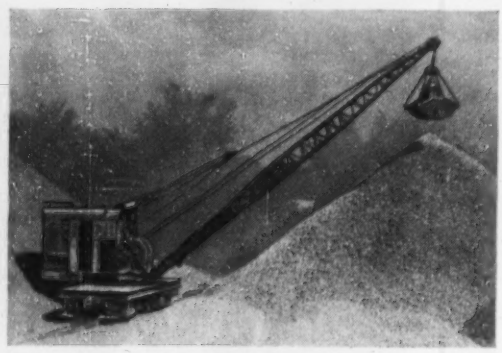
☐ Please Send RUST-OLEUM Catalog
☐ Have Qualified Representative Call To Give Specialized Information
☐ Send Free Sample Can of RUST-OLEUM In The Following Finish or Color

"She's 26 years old...
and **more** rugged than ever!



Railway Crane repowered with a D-326 Cat equipped with S-N Gear Model 2265-12/3065 - 5P

thanks to **S-N reduction gears"**

says The Dolomite Products Co., Penfield, N. Y.

Repowering this Brownhoist Railway Crane with a new "Cat" engine called for a transmission gear unit that would stand up to the gruelling, rugged grind of heavy stock-piling jobs . . . provide smooth transmission of full power from engine to load with a minimum of maintenance cost. S-N heavy duty herringbone Reduction Gears with Cut-off Clutches, *meet all these requirements . . . and more!* Can be installed as original equipment, too, with all types of engines from 40 H. P. units to 775 H. P. giants. Available in a broad range of reduction ratios — 1.5:1 up to 4:1. ***Write industrial division for catalog sheets.***

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GENERAL OFFICES—ALLENTOWN, PENNA. U.S.A.

MANUFACTURERS OF THE CEMENT GUN

power but with the same fan-to-flywheel length limitations—61¾ in.

The engine is available with a 12, 24 or 32-v electrical system according to the user's requirements. The turbosupercharger is exhaust-driven. HERCULES MOTORS CORP., CANTON, OHIO.

27-ounce electrode holder has high amperage capacity

A new manual electrode holder has been developed to meet the demand for a light weight, high amperage tool for arc welding. It weighs just 27-ounces—but handles electrodes from $\frac{3}{32}$-in. dia up to $\frac{5}{16}$-in.

Departing from conventional design, the tool features air vents between the holder castings and the insulation. On higher amperage work, heat from the arc—which is absorbed by the castings—is dispelled through these ventilating ducts.

To permit a free flow of cooling air, the holder is supplied with a large diameter handle that has only point contact with the casting. The new wedge-shaped upper jaw is reported to provide maximum pressure with minimum contact area for cooler running.

This holder model—as well as all others in the line—has laminated glass cloth insulation that resists extreme heat and impact. TWECO PRODUCTS CO., BOSTON AT MOSLEY, WICHITA 1, KAN.

Rock ripper has three-position control

Production of a heavy-duty rock ripper for Caterpillar D8 and D8 pusher crawler tractors is now under way. The 8,000-lb, hydraulically-operated unit features three-position pin spacing on standards for selection of the desired maximum ripping depth—18,24 or 30-in., with 9-in. head frame clearance.

The drawbar mounting design confines pulling loads to the drawbar instead of the transmission case, leaving track frames clear for dozer installation.

Five-hundred-pound ripper standards are curved and tapered for easier penetration, and are said to be contoured scientifically to provide added strength at points of maximum strain. They connect to the head frame through swivel-pinned brackets in order to follow the tractor like a trailer, for easier steering.

Heavy-duty replaceable rock points on the standards shear and roll rocks up and out in the clear back of the

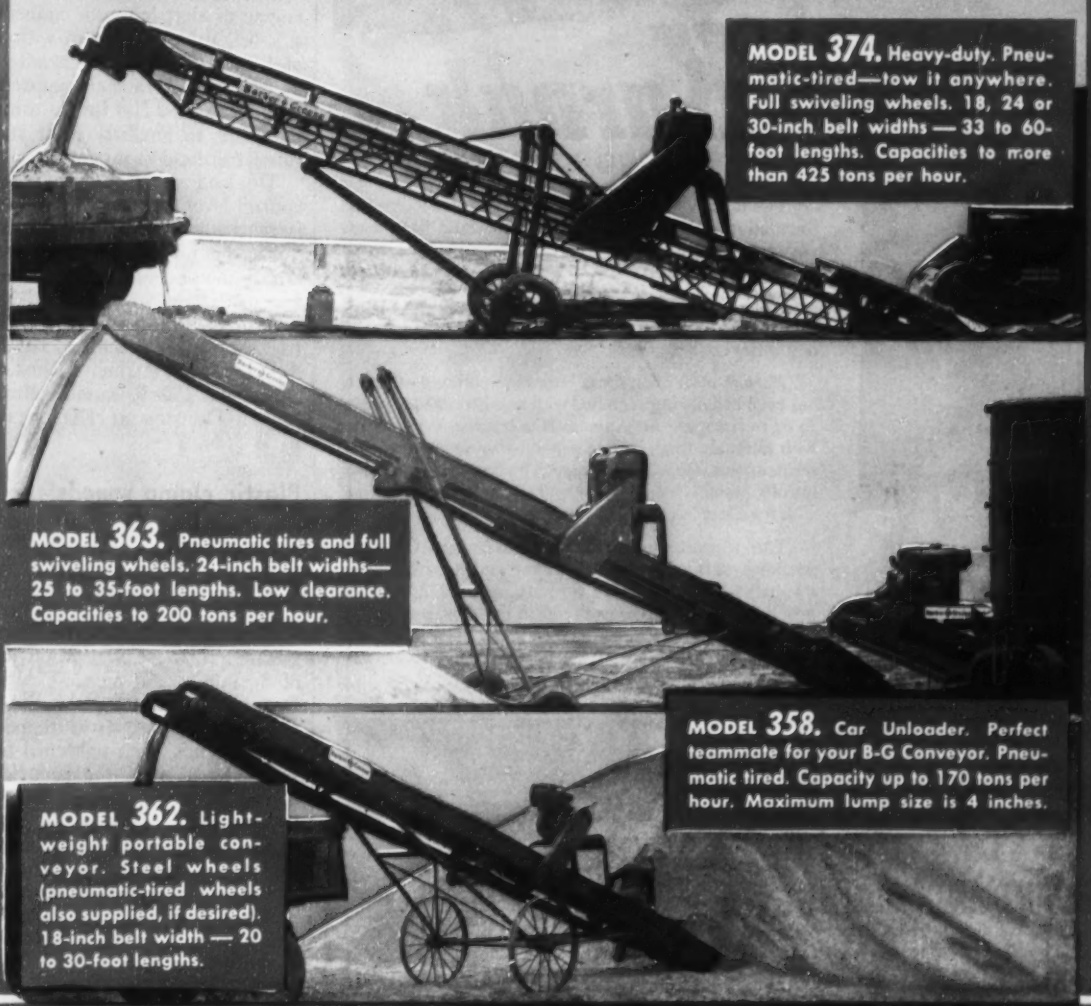
(Continued on page 74)

BARBER-GREENE HAS THE

PORTABLE CONVEYORS YOU NEED

Here are three standard B-G Portable Conveyors together with B-G Car Unloader . . . all available for prompt delivery from your B-G distributor. These skillfully designed and ruggedly built machines will—within the limits of their capacities—provide you with the most efficient and economical method of handling sand, stone, gravel, coal, coke, ashes, wet concrete, chemicals, bags and boxes.

In addition to the models shown, Barber-Greene also builds larger capacity portable conveyors. Why not check with your B-G distributor for complete information on portable conveyors?



MODEL 374. Heavy-duty. Pneumatic-tired—tow it anywhere. Full swiveling wheels. 18, 24 or 30-inch belt widths — 33 to 60-foot lengths. Capacities to more than 425 tons per hour.

MODEL 363. Pneumatic tires and full swiveling wheels. 24-inch belt widths—25 to 35-foot lengths. Low clearance. Capacities to 200 tons per hour.

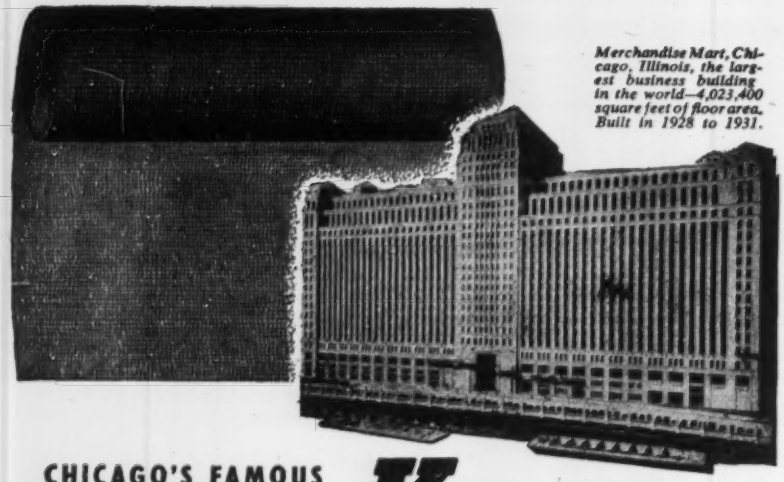
MODEL 358. Car Unloader. Perfect teammate for your B-G Conveyor. Pneumatic tired. Capacity up to 170 tons per hour. Maximum lump size is 4 inches.

MODEL 362. Lightweight portable conveyor. Steel wheels (pneumatic-tired wheels also supplied, if desired). 18-inch belt width — 20 to 30-foot lengths.

Barber-Greene

BG

Aurora, Illinois, U. S. A.



Merchandise Mart, Chicago, Illinois, the largest business building in the world—4,023,400 square feet of floor area. Built in 1928 to 1931.

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WATERPROOFING PRODUCTS

Karnak fabric is packed in sturdy, corrugated cartons for protected shipping and storage. They keep the fabric in perfect condition until used . . . cut fabric loss.

Twenty-five years ago, the problem of protecting the foundation of the "Mart" from hydrostatic head was answered with *Karnak*. Even though the big Chicago River flows beside it, *this Karnak job holds secure.*

Why was *Karnak* chosen? Because it is the membrane system of waterproofing *that holds tight against any water condition.*

Karnak is an open mesh long-fibre cotton cloth that has been heavily impregnated with highly refined asphalt *so as to leave the mesh open.* It is layered, on the job, with alternate moppings of asphalt to *provide a tough, resilient, waterproof membrane.* The non-sticking fabric unrolls easily . . . to the very end. It "works" faster and with no waste . . . saves labor costs.

The *Karnak* Membrane System is best for roof patching, skylight flashing, window and door flashing, through-wall and cornice flashing, as well as waterproofing against a hydrostatic head in dams, swimming pools, viaducts and tunnels. Send coupon for complete information. Manufactured by Lewis Asphalt Engineering Corp., 30 Church Street, New York 7, N. Y.

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PITTSBURGH 20, PA.

NEW PRODUCTS

head frame. American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif.

Lightweight ladder hoist —1- to 3-story specialty

A lightweight ladder hoist has been adapted especially to the needs of roofers whose operations are on one to three-story buildings. Since it weighs only 80 lbs, the hoist can be mounted on any ladder up to 40 ft—and is moved easily from one position to another.

The mechanism consists of a gas engine or electric motor connected by a V-belt drive to a drum with 125 ft of ½-in. manila rope. It handles loads up to 100 lbs—but the capacity can be increased to 200 lbs by using wire rope and an auxiliary hoist stand or tubular scaffold as mounting.

The load is moved up by raising the control lever and stops when the lever is released. The brake automatically holds the load in this position. By raising the brake lever, the load can be lowered at any speed desired.

Price of the unit is $108 with electric motor drive and $137.50 with the gasoline engine. Reimann & Georger, 250 R and G Building, North Division at Ellicott, Buffalo 3, N. Y.

Plastic clamp speeds pipeline installation

A new molded plastic clamp now in production permits fast installation of all-plastic pipelines.

The clamp is used to produce a tight, permanent seal when sections of flexible plastic pipe are connected by means of inserting couplings, tees, ells and adapters. It is slipped over the pipe ends, then tightened to force them down onto the serrations included in insert fittings to create a leakproof connection.

The clamp—said to be unaffected by rot, rust or electrolytic corrosion—is molded in two separate threaded sections. Butted against a shoulder at the base of the threads in one half is a synthetic gasket with a V-shaped groove. When the clamp's other half is screwed down onto this gasket, it is forced against the pipe. Thus a full 360-deg pressure is exerted on the pipe to make it grip the fittings tightly.

Easy to tighten by means of a strap wrench, the clamp can be removed and reused when pipe installations are changed. It's produced in sizes for ½, 1, 1½, 2, 3, 4 and 6-in. plastic pipe. Carlon Products Corp., 10225 Meech Ave., Cleveland 5, O.

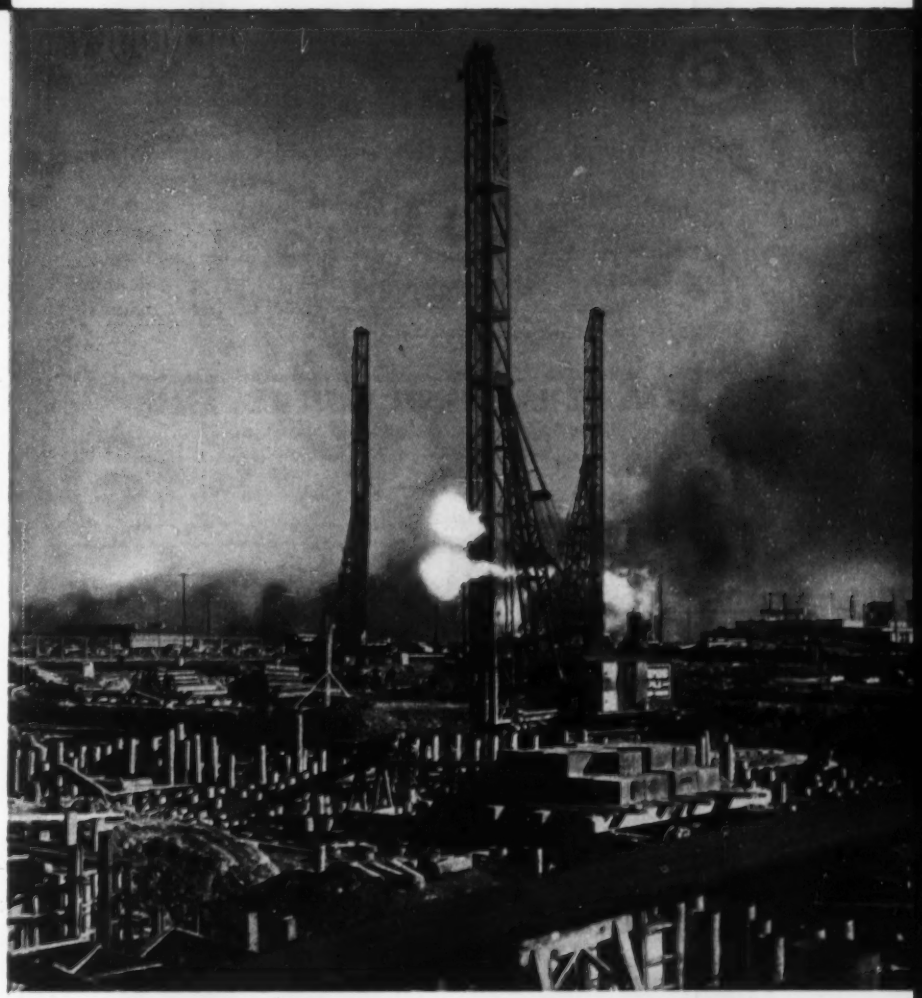
Raymond Features!

NUMBER SIX OF A SERIES

Raymond service

SAVES YOU MONEY!

FOR the Anheuser-Busch Brewery, Newark, New Jersey, the Raymond Concrete Pile Company performed the soil investigation, drove the test piles, and installed the bearing piles. The work was completed ahead of schedule—a typical example of Raymond's three-point service in action. We welcome the opportunity of discussing your foundation problems.



Raymond rigs driving piles at the Anheuser-Busch Brewery in Newark, N. J.

ENGINEERS: Harley Ellington & Day, Detroit
GENERAL CONTRACTOR: Geo. A. Fuller Co., New York

RAYMOND'S DOMESTIC SERVICES . . .

SOIL INVESTIGATIONS • FOUNDATION CONSTRUCTION • HARBOR AND WATERFRONT IMPROVEMENTS PRESTRESSED CONCRETE CONSTRUCTION • CEMENT-MORTAR LINING OF WATER, OIL AND GAS PIPELINES IN PLACE.

RAYMOND'S SERVICES ABROAD . . .

AROUND THE WORLD FOUNDED 1897

In addition to the above, all types of General Construction.

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TWA twin hangars, Chicago, each 270 feet long, with clear span of 270 feet and center height of 65 feet. Five arch ribs were poured monolithically with shell over prefabricated falsework furnished by Timber Structures, Inc. Each hangar was completed in two sections, with falsework being lowered and moved intact into position for pouring the next section. Hangar was designed by Ammann & Whitney, engineers; W. E. O'Neil Construction Co., Chicago, was general contractor.

Save Time and Money
with *Prefabricated Falsework*

This roof arch form is Timber Structures' answer to the need for sturdy, precision built falsework that is thoroughly engineered, quickly assembled and easily moved for repetitive use. It required only two hours to move the assembly into position for the second pour, and only half a day to move it intact into the adjoining hangar. ...Let us show you how similar falsework will speed your work and increase profits on your next job. See your nearest Timber Structures office, or write for information.

TIMBER STRUCTURES, INC.

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Offices in Ramsey, N. J.; Chicago; Detroit; Lenexa, Kansas; St. Louis; Minneapolis; Columbus; Milwaukee; Omaha; Des Moines; Wichita; Dallas; New Orleans; Birmingham; Charlotte; Louisville; Memphis; West Hartford, Seattle; Spokane; Eugene; Richmond, Calif.; Peterborough, Ontario; New Westminster, B. C.

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- RIGID . . . NON-SAGGING
- REQUIRES LESS FASTENING

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PUBLICATIONS

Weld strengths—A weld strength calculator is available for the convenience of designers, engineers and others interested in steel plate fabrication. A companion tool to Luken's plate size selector, the weld strength calculator is a plastic side rule that indicates both the size of the weld required for a given applied load and the weight of a given length of weld in pounds. The calculator gives values for stresses, ranging from 2,000 to 20,000 psi and applied loads of from 9,000 to 450,000 lb. On the reverse side of the pocket-size calculator, basic data for welding connections is graphically shown and formulas for calculating nominal properties of welded connections are listed in convenient form.—LUKENS STEEL CO., 611 LUKENS BLDG., COATESVILLE, PA.

Hoists—An 8-page catalog contains illustrations, descriptions and specifications for over 100 different types and sizes of portable hoists. Among the units described are Coffing ratchet lever hoists with capacities from ¾ to 15 tons, a complete line of standard and specialized spur gear hoists, electric hoists, all-purpose hoist-alls and a wide variety or utility maintenance tools. COFFING HOIST CO., 800 WALTER ST., DANVILLE, ILL.

Heating system—How to produce a better heating system, and stretch the capacity of the burner, boiler and radiation is described in three new "salesman's" 4-page bulletins. Bulletin E-353 describes the method and the end results of Weather-Flo operation, a heat control system. Bulletin F-453 describes its application to hot water systems. Bulletin H-653 describes its application to warm air systems.—AUTOMATIC DEVICES CO., INC., WESTERN SPRINGS, ILL.

Boilers—Catalog No. 80 has been published as a reference guide for the architect, engineer and heating contractor. The booklet contains the latest data on the entire line of Kewanee high and low pressure steel boilers for commercial, industrial and residential use. Also included in the new catalog are full descriptions and illustrations of Kewanee water heating products, both direct fired and storage types as well as indirect water heating coils. Pages on boiler support brackets, structural steel suspension and induced draft fans for Kewanee boilers complete the technical manual. KEWANEE-ROSS CORP., KEWANEE, ILL.

PITT CHEM licks weather at Ford Rotunda

When the Ford Motor Company remodeled the well-known Ford Rotunda for its 50th Anniversary exhibits last year, protection of new steel dome supports against year-round exposure to weather and industrial atmosphere was a high priority project. Ford maintenance engineers specified Pitt Chem Tar Base Coatings. You'll discover, too, that no other material does such a complete, economical job of protection.

Pitt Chem Coatings are formulated from coal tar pitch for one and just one purpose—to *stop corrosion*. They're tough. They're durable. And their applied film is up to ten times as thick as ordinary paint. What's more, you don't need special equipment or a degree in engineering to apply them.

If that sounds like the kind of a hard-working, never-say-Uncle protective coating you've been looking for, let's have your maintenance experts and ours make contact. A survey will cost nothing. A letter or phone call will get it started.

W&D 4997

PITT CHEM 101—For Severest Conditions
PITT CHEM 102—Maintenance Coating
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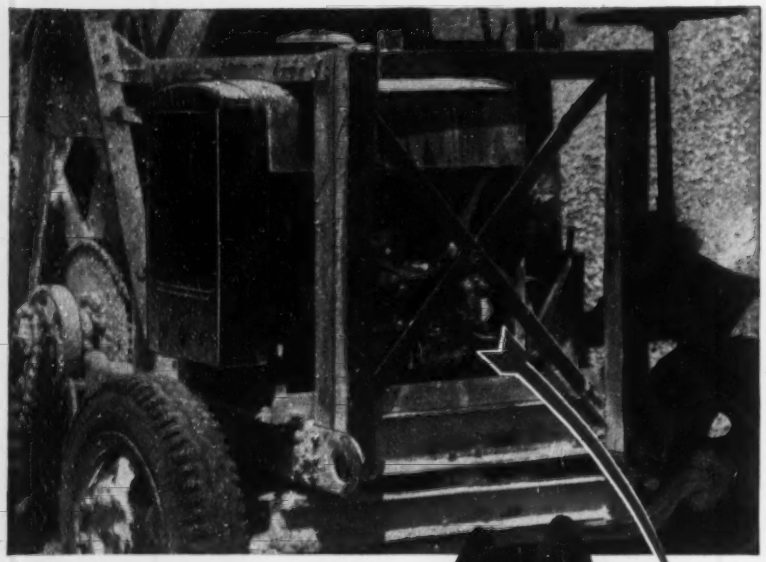

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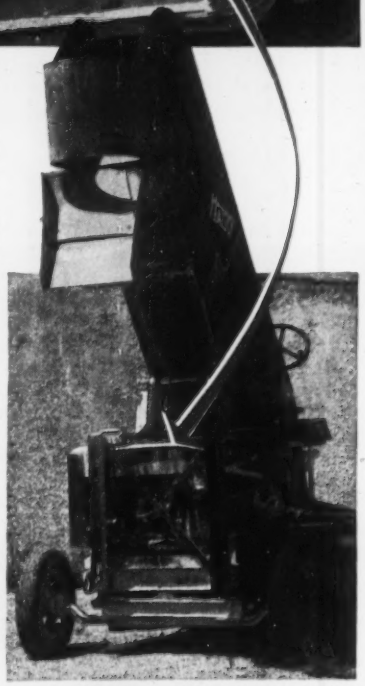

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ADVERTISERS IN THIS ISSUE

Allis-Chalmers Mfg. Co. 14, 15
Armco Drainage & Metal Products Inc. ..... 2nd Cover

Barber-Greene Co. 73
Belmont Iron Works 58
Bethlehem Steel Co. 43
Bucyrus-Erie Co. 51
Byers Co., A. M. 69

Cement Gun Company 72
Cole Mfg. Co., R. D. 44

Dicalite Div., Gt. Lakes Carbon Corp. 2
Dudgeon, Inc., Richard 58

Economy Forms Corp. 55
Eimco Corp., The 8, 9

Fairbanks-Morse Co. ..... 3rd Cover
Frost, Jack A. Co. 58

Griffin Wellpoint Corp. 55
Gunite Concrete & Const. Co. 48
Gunite Construction Corp. 78

Harnischfeger Corp. 1
Hough Co., Frank G. 16

Ideco Div., Dresser-Stacey Co. 6
Insley Mfg. Corp. 47
Insurance Co. of North America 56
International Harvester Co. 11
Irving Subway Grating Co. 12

Laughlin, Thomas Co. 49
LeRoi Company 78
LeTourneau-Westinghouse Co. 28, 29
Lewis Asphalt Engr. Corp. 74
Lincoln Electric Co. 7
Lone Star Cement Corp. 18
Luria Engr. Company 10

McGraw-Hill Book Co. 12
McKiernan-Terry Corp. 48
Moretrench Corp. 68

Northwest Engineering Company 3

Pennsylvania Drilling Co. 74
Permacrete Products Co. 78
Phoenix Bridge Co. 74
Pierce Governor Co., Inc. 13
Pittsburgh Coke & Chemical Co. 77
Pittsburgh Plate Glass Co. 79
Portland Cement Assn. 35

Raymond Concrete Pile Co. 75
Roebling's Sons Corp., John A. 70
Rust-Oleum Corp. 71
Ryerson & Sons, Inc., Jos. T. 20

Servicised Products Corp. 78
Snow-Nabstedt Gear Corp. 72
Sonoco Products Co. 52, 53
Spencer, White & Prentis, Inc. 54
Sprague & Henwood, Inc. 68
Standard Dry Wall Products Inc. 45
Superior Concrete Accessories Inc. 37
Symons Clamp & Mfg. Co. 44

Texas Company 4, 5
Timber Structures, Inc. 76
Timken Roller Bearing Co. ..... 4th Cover
Tinney Drilling Co. 48
Truck Mixer Mfg. Bureau 40

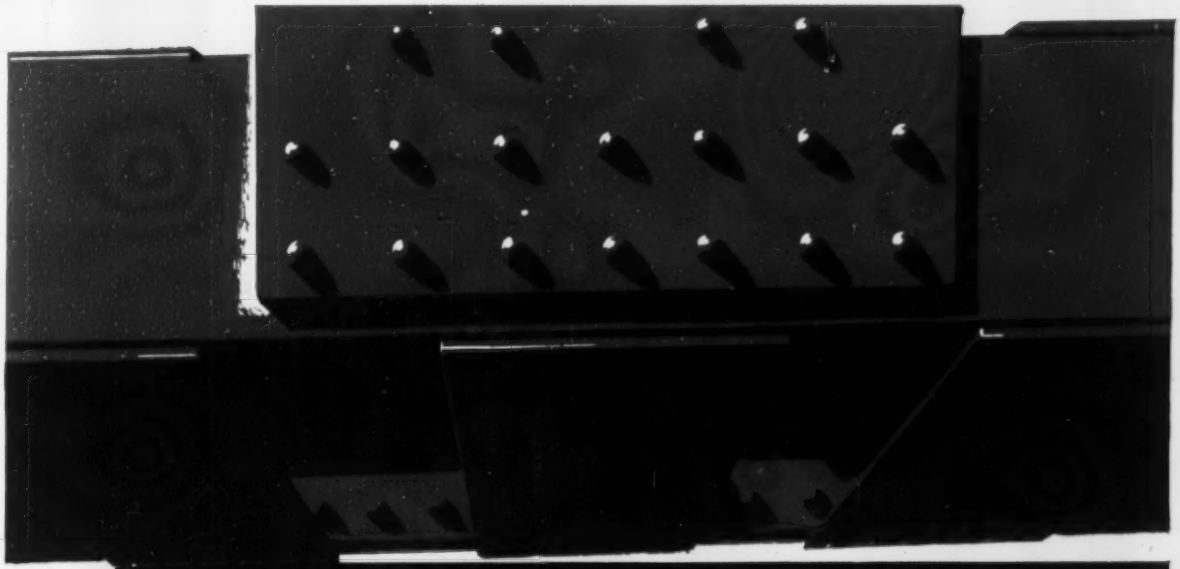
Union Mercantile Co. 68

Professional Services **67**

SEARCHLIGHT SECTION

(Classified Advertising)
H. E. Hilty, Mgr.

Employment 62, 63
Business Opportunities 63
Educational 63
Notices
Proposal 59, 60
Equipment
(For Rent, Sale, Wanted) 62, 67



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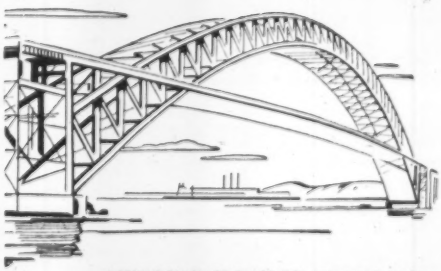

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EDITORIALS

More schools for the money

A BLEAK PICTURE of the school situation is painted by the U. S. Office of Education in its report to Congress. That report indicates that local and state governments are unable to raise enough money to finance public-school construction needed now, and certainly far less than will be required in the next few years for replacement of obsolete facilities and additional plant to serve increasing enrollments (ENR Feb. 11, p. 27).

The report suggests several ways for communities to raise more money, but concludes that the amount obtained still would be inadequate, implying that federal subsidies are necessary. There is, however, another alternative open to school districts: Build less expensive schools, and thus make possible more school plant for the funds available.

That substantial reductions in construction costs may be feasible is suggested by a cost comparison of new schools in various parts of the country. For example, schools in North Carolina, built to fine standards, are being constructed for less than $11.50 per sq ft, whereas schools in other states generally cost more than $12 per sq ft, in some cases exceeding $25 (ENR Oct. 8, 1953, p. 181).

Even though land and labor costs may be higher in some parts of the country than in North Carolina, these do not constitute the whole reason for the higher cost of schools. A cause more susceptible to correction is the desire of educators—widely supported by parents—to raise the standards of school facilities to the highest possible level. This is proper and highly commendable, so long as it is not self-defeating. But if this results in bond issues so large that they are voted down, nothing is gained.

If, therefore, the school situation is as unsatisfactory as the U. S. Office of Education warns, it would seem to be up to the educators themselves to re-examine their requirements for school plant and to recommend changes that will result in lower costs. Until this is done, it should be noted, there is little that individual architects or engineers can do to effect substantial savings. To meet the high standards demanded, they can only resort to costly design.

Basically the problem is one of examining every phase of a project from establishment of space and equipment requirements through the actual design and handling of construction. Among the principal items worthy of study are the amount of classroom space per pupil and teacher, need for office space, heating and lighting requirements and the necessity for basements. Also, it might be worth while to look into the possibility of cutting the size of auditoriums by planning for their use only by small groups. Savings, in addition, could be brought about by dual use of some facilities; the auditorium, for example, could also serve as a gymnasium when not needed for assemblies. Finally, requirements leading to the use of costly types of equipment might be re-appraised.

Such an investigation, however, would be only a start. Given some changes in standards as a result of it, further analysis of individual school design would indicate where other savings can be made—in layout, shape of building, number of stories, fireproofing requirements, selection of building materials. In addition, lower costs can often be brought about by taking bids when contractors are not busy and therefore anxious to get new work.

High costs of schools are first a result of special high requirements other than for desk space alone, which the educators can remedy. Subsequent cost reductions are matters of design, which architects and engineers can improve. The result of such a joint attack could be enough cost reduction to permit more schools to be built. Thus, federal subsidies could be avoided.

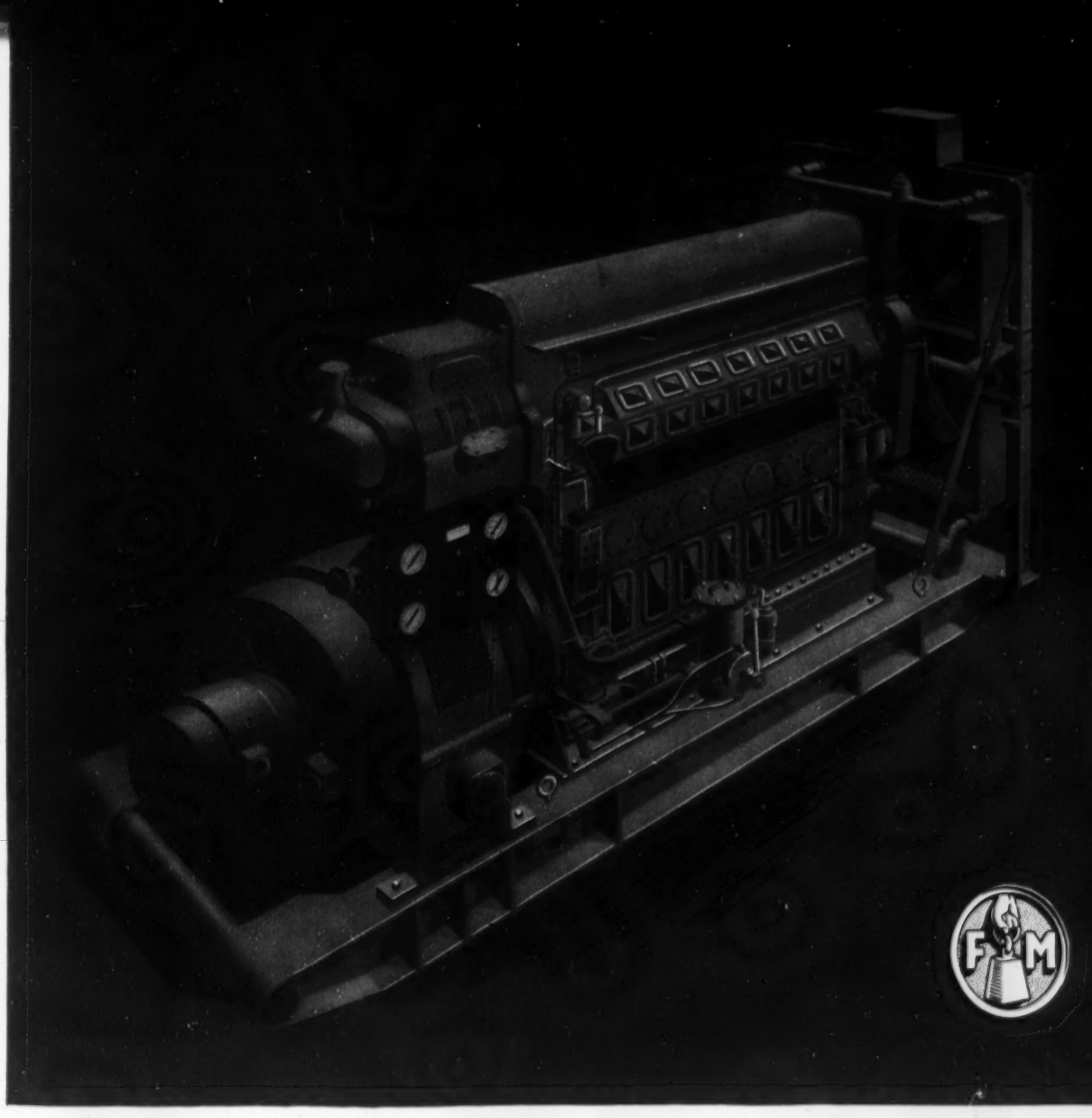
Fostering waterworks careers

TWICE within recent months there have been public expressions of concern over the future for young men entering the waterworks field. First it was Stanley Dore as he assumed presidency of the New England Water Works Association, telling that organization's members they must foster careers, not just fill jobs. Then it was John H. Murdoch, Jr., vice-president and counsel of American Water Works Service Co., addressing the New York Section of the American Water Works Association last month.

Mr. Murdoch said that the waterworks field is no place for a young man unless it widens its horizons. He charged that the justifiable feeling of pride in past accomplishment among waterworks men has the danger of turning to conservatism; and in some cases this conservatism has already reached advanced stages of complacency and mental stagnation. But there remains plenty of challenge for young men in the waterworks field, claimed Mr. Murdoch, and it is to be found in many unsolved problems, of which he named several.

Mr. Murdoch is right. There is still room for much new thinking on scientific and business problems of the waterworks field. Mr. Dore is right. Careers must be fostered.

But the basic problem neither man tackled is the difficulty in fostering careers. This problem exists in the waterworks field just as it exists in other utilities and in most public service. It is the difficulty of meeting competition for the available men. The challenge of unsolved problems is good as far as it goes. But the basic problem—bothering other fields as well—will be solved only by enabling waterworks managers to meet the current price for manpower.



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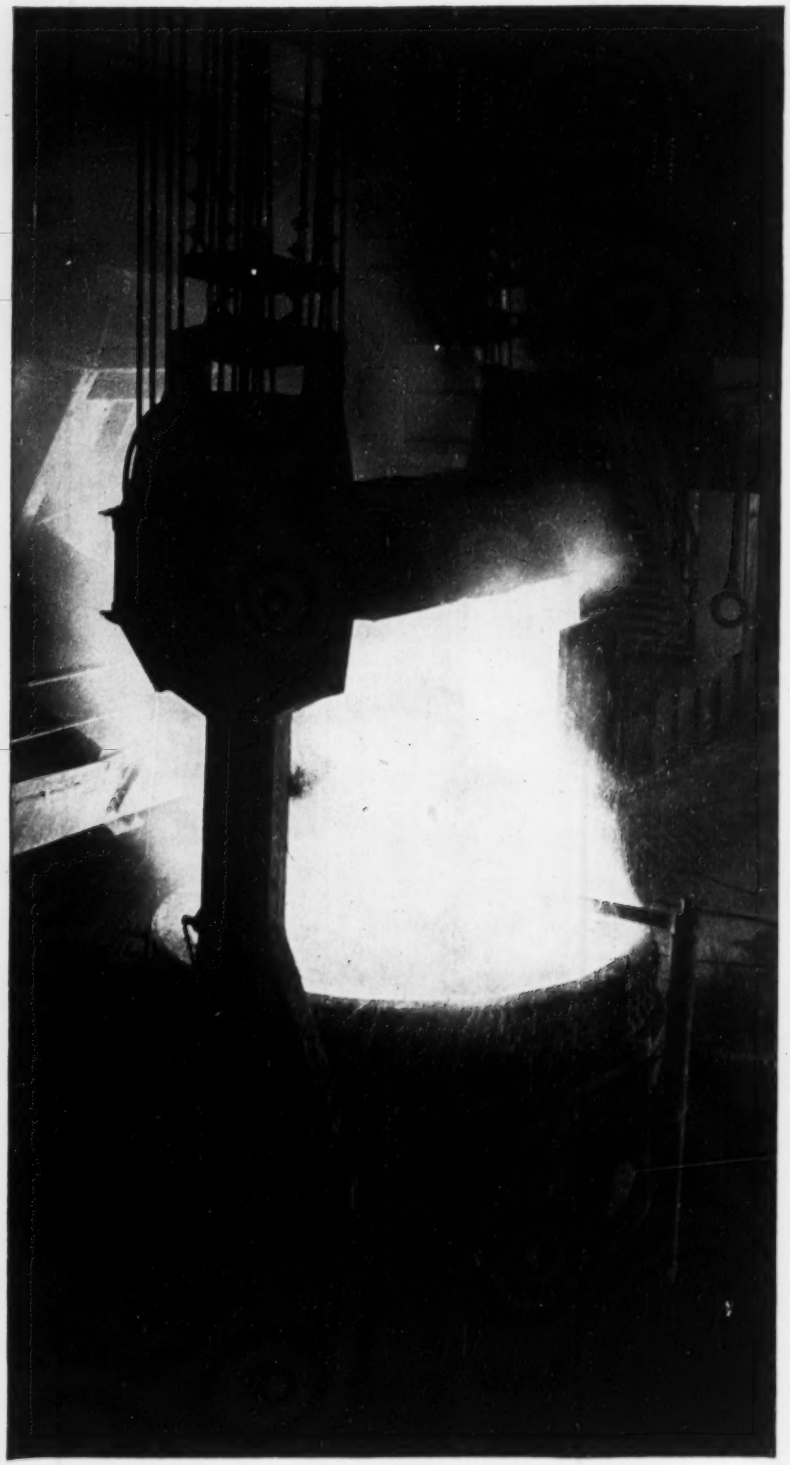

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